

# **California Department of Forestry and Fire Protection**

**Review Report of Serious Injuries, Illnesses,  
Accidents and Near-Miss Incident**



## **Jesusita Fire Burnover**

**Firefighter Burn Injuries with Engine Burnover,  
and Additional Related Near Miss Incidents**

**Wednesday, May 6, 2009**

**CA-LPF-001479 – P5EV5C  
CA-CSR-000031**

## TABLE OF CONTENTS

REVIEW TEAM PROCESS	PAGE 3
SEQUENCE OF EVENTS	PAGE 6
OVERVIEW OF SPYGLASS RIDGE	PAGE 12
MAP OF SPYGLASS RIDGE	PAGE 21
OVERVIEW OF MISSION ROAD	PAGE 24
MAP OF MISSION ROAD	PAGE 31
OVERVIEW OF HOLLY ROAD	PAGE 34
MAP OF HOLLY ROAD	PAGE 41
OVERVIEW OF TUNNEL ROAD	PAGE 45
MAP OF TUNNEL ROAD	PAGE 52
OVERVIEW OF PALOMINO ROAD	PAGE 55
MAP OF PALOMINO ROAD	PAGE 60
INCIDENT PROGRESSION MAP	PAGE 66
S-215 FIRE OPERATIONS	PAGE 67
PPE REPORT	PAGE 69
WOLFPACK WEBGEAR REPORT	PAGE 80
TRAINING REVIEW REPORT	PAGE 87
SAFETY REVIEW REPORT	PAGE 93
FIRE BEHAVIOR ANALYSIS	PAGE 95
FINAL SUMMARY	PAGE 98

## REVIEW TEAM PROCESS

The review process of this incident comprised of an evaluation of the accident sites along with an analysis of the damage to the personal protection equipment (PPE), mobile equipment, fire conditions, fuel, and topography that existed at the time of the accidents. Statements were taken from those involved to help construct a timeline and present a clear picture of the chain of events leading up to and through the conclusion of the incident. An examination of the PPE and discussion with the manufacturers were required to determine the extreme conditions that existed at the time of the incident.

The Serious Accident Review Team (SART) was activated the evening of May 6, 2009, with reporting instructions for the following morning at the Jesusita Base Camp in Santa Barbara. The team formed and received a briefing from the IC. The team members were Dale Hutchinson, Team Leader, MMU; Kevin Gaines, Lead Investigator, RRU; Matthew Conoscente Investigator RRU; Chris Palmer Investigator RRU; Larry Harris Investigator TUU; Pat Sparks Investigator SLU; Paul Alvarez Investigator MMU; Mark Derosier Investigator BDU; Jane Schmitz Investigator SLU; Greg Grizzell Investigator Southern Region Riverside; Kurt Winchester BDF USFS Agency Representative; Marty Hamel, Safety Program representative ANF USFS; Robert Bell Training Program Specialist ONC USFS; Darren Hensley, Mobile Equipment Technical Specialist, Southern Region Riverside; Misty Marschall, Documentation Unit Leader, SLU Unit; Bill Weiser, Cost Unit Leader RRU; Jeff Isaacs, CDF Firefighters Representative, SCU Unit; Mike Ramirez Tech Spec. SAC; Jeff Shelton Fire Behavior Analyst ORC; Steve Kennedy GIS Specialist VNC; Dave Chovanec, and Jon Bergh were assigned to the team as the Ventura County Fire Dept. Liaison.

The SART met and discussed the course of the investigation and established guidelines and a time table for the first part of the accident review. A visit to the accident sites was conducted by investigators and Technical Specialist. Pictures of the scene and the PPE were taken by Investigators for the report. A copy of the dispatch log was provided and the recording of the radio traffic was also provided.

The lead investigator instructed the other investigators to interview all personnel that responded to or was at scene of the accident. Those interviews were scheduled and performed by the investigators assigned to the specific accident site. CDF Firefighters provided representation for the SART and Union representation was provided by the specific agency.

The Training program representative examined the training records of the personnel involved. It was determined that everyone met or exceeded minimum qualifications required for the positions held.

The Safety program representative examined and cataloged all of the PPE in use by those involved in the Spyglass incident. PPE Technical specialist from Missoula Montana and Southern Operations Riverside responded to analyze the PPE and fire shelters. Their report details as to the amount of heat that the PPE was subjected to and to possibly determine the temperature when the firefighters were burned. The President for Wolfpack was also contacted and analyzed the Wolfpack web gear and provided a detailed report.

The Mobile Equipment technical specialist examined the maintenance records of all equipment involved. It was determined that one of the Santa Paula Engines did not have the required ember screen.

The Documentation Unit Leader was to collect copies of all documents and photographs regarding the accident review. Each accident site has its own documentation box and labeled on the SART Investigative File Inventory (IFI).

On May 18, 2009 the team having completed the initial review of the sites, interviews, photos, and the equipment involved were released through ROSS and returned to their home units. The team reformed on June 29-July 2, 2009 in Santa Barbara to start the completion of this document.

## **Jesusita Fire Command Structure**

On Tuesday, May 5, 2009, at 1:45 PM, a wildland fire was reported burning in the foothills north of the City of Santa Barbara along the “Jesusita” hiking trail within the Los Padres National Forest DPA (not on the Forest)– Santa Barbara Ranger District. Los Padres National Forest (LPF), Santa Barbara County Fire Department (SBC), and Santa Barbara City Fire Department (STB) initiated a coordinated wildland fire dispatch of fire suppression resources to the incident.

The first arriving SBC Division Chief reported a fire burning in heavy brush along the Jesusita Trail, approximately 1 mile above the Lauro Canyon reservoir, within the Direct Protection Area of the LPF. Access into the fire area was limited by the mid slope location of the fire. By 2:30 PM, Unified Command was established with the three agencies. Potential existed for the fire to move into State Responsibility Area (SRA), as well as the urban interface area, and a Type 1 Incident Command Team was selected to manage this incident due to the anticipated complexities of incident management. A CAL FIRE Incident Command Team (ICT) was ordered based on the predicted weather and potential for fire spread down slope off of the Forest, into SRA, and urbanized areas of Santa Barbara.

On Wednesday, May 6, 2009, an extended attack command structure (Type 3 Incident Command Organization per Interagency Standards for Fire and Aviation Standards – “Red Book”) conducted the operational briefing. This briefing covered incident objectives, weather, division assignments, communication plan, and a safety message. Weather predictions were discussed during the morning briefing for the potential of down slope “Sundowner” winds for the late afternoon and evening hours. The incident was planned to transition to CAL FIRE ICT-4 at 6:00 PM.

The IAP communications plan for May 6, 2009 assigned the Structure branch on one tactical frequency. This consisted of the Mission Structure group with 4 type 1 Strike teams, the Tunnel Structure group with 4 type 1 strike teams and the San Roque Structure group with 3 type 1 strike teams assigned. Additional Type 1 strike teams were assigned from staging and off duty(resting) to this same tactical frequency which resulted in an over tasking of one frequency.

## **Sequence of Events**

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The fire was estimated at 400 acres, and later reduced in size to 200 acres after more accurate mapping. Fire spread was topography and fuel driven, and the predicted winds had not yet surfaced. The incident strategy for perimeter control included direct attack using Fire Crews, Type 3 engines, and aircraft. The fire was divided into two branches; Branch I (East portion), and Branch II (West portion). Branch I control operations were direct attack starting in the Spyglass area in Mission Canyon working to the West. Branch II control operations were direct attack from the origin along the Jesusita trail working to the East. Both Branches had significant challenges with limited access to the fire line and the mid slope location of the fire.

The Structure Protection Branch coordinated fire suppression resources among the residential areas. Three Structure Groups were developed: Tunnel Structure Group for the Tunnel Road area; San Roque Structure Group for the San Roque Canyon area; Mission Structure Group for the Mission Canyon Road

area. Control operations for all structure groups within the Structure Branch were to prepare and triage structures which could be threatened by an advancing fire.

Access challenges existed for all Structure Groups due to the narrow roads, ornamental and native vegetation, and the arrangement of the homes among the canyons and ridges. Additionally, the main access route for all structure groups was the same for Branch I. An evacuation order was in place for the northern portions of Mission and San Roque Canyons.

A Staging Area was set up at the Incident Base at Earl Warren Show Grounds. There was a considerable amount of fire suppression resources staged due to the possibility of fire progression down slope due to the forecasted “Sundowner” winds. Resources continued to arrive at staging throughout the day.

At approximately 2:20 PM, the fire was slightly over 200 acres, and the windy conditions at the higher elevations grounded the fixed wing aircraft. The fire continued to become more active as Northwest “Sundowner” winds began to surface, and a high intensity backing fire started to push down slope toward structures in the Mission Canyon Area. Branch I disengaged perimeter control resources and removed them from the upper sections of Mission Canyon due to this increase in winds and fire behavior. Branch II also disengaged the perimeter control resources and moved them back to a safe location. Both Branches were now experiencing stronger winds and increased activity.

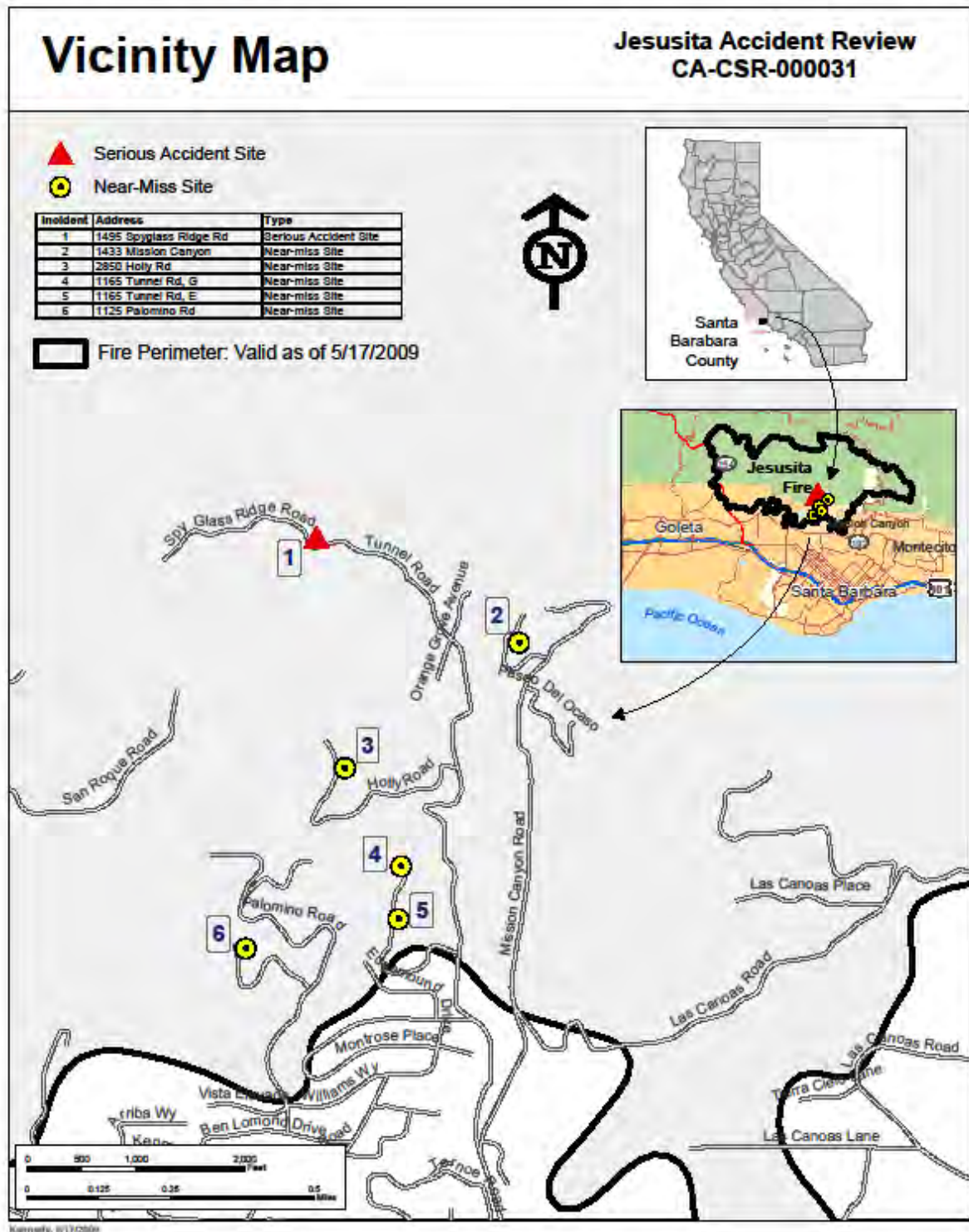
Structure Branch recognized the increased fire activity, and was coordinating resource movements within the Tunnel Group and Mission Group for structure protection. At 3:39 PM, Branch I reported significant fire activity and that the fire had moved down slope and was in the vicinity of the water tank at the end of Tunnel Road. Winds were reported to be between 20 and 30 miles per hour from the Northwest. At 3:46 PM, the Operations Section Chief reported substantial fire activity in the upper Spyglass Ridge Road and Mission Canyon area. In addition, the winds had increased to velocities that grounded rotary wing aircraft. At 3:50 PM hours Branch I reported the fire was burning above and below homes and resources in Mission Canyon and advised Structure Branch to pull the resources out of Mission Canyon.

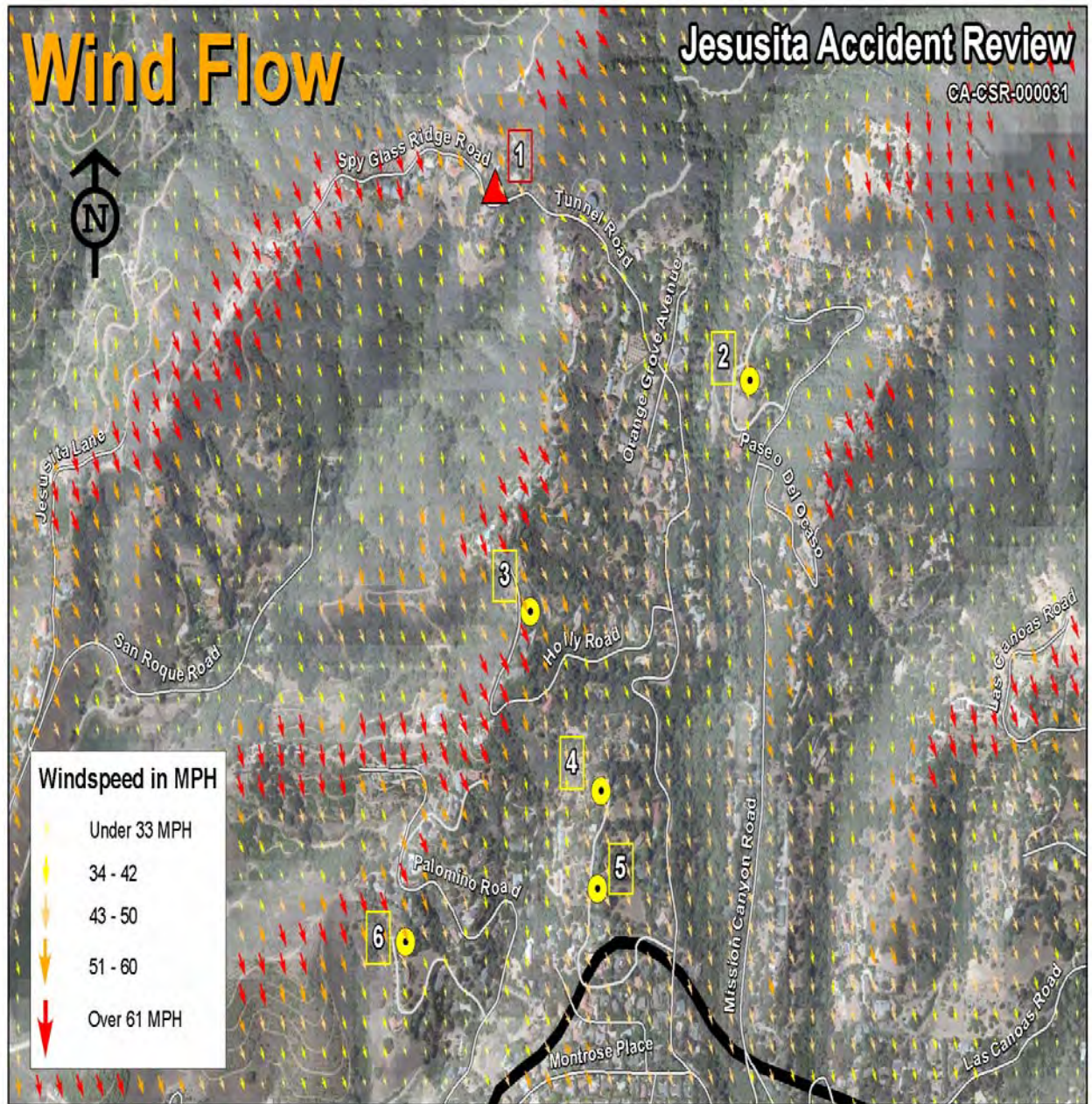
At 3:52 PM, Tunnel Structure Group requested additional strike teams of engines for structure protection as the fire was spotting ¼ mile in front of the main fire front which was headed down slope. At approximately 4:00 PM, the fire front moved into the residential areas of upper Mission Canyon. Spot fires ahead of the fire front became established in the drainages above Lauro Reservoir, and caused multiple uphill fire runs from all directions into the residential areas of Mission Canyon. Engine companies assigned to Mission and Tunnel Structure Groups became engaged in structure protection operations.

Radio reports of firefighters trapped in structures, taking refuge in structures, or taking refuge in their engine were being reported. At 4:08 PM, the first report of injured firefighters was received. The Operations Section Chief and Structure Branch Director directed resources into the Mission Canyon area to assist with structure protection. Narrow roads, extreme fire behavior, downed powerlines, and heavy smoke conditions precluded fire suppression resources from exiting the area, as well as hampering resources from entering into the area to assist. Residents who remained in their homes within the evacuation area sought refuge with various engine companies in various locations. Multiple homes were burning adding to the heavy smoke and extreme temperatures. Some water systems within the residential area lost volume and pressure. Strike Team Leaders and Engine Companies were bringing injured personnel to Santa Barbara County Fire Station 15 (located at Mission Canyon Road and Foothill Road) for initial treatment, or were taking them directly to the hospital outside of the knowledge of the incident. Residents that sought refuge with engine companies were escorted out of the area.

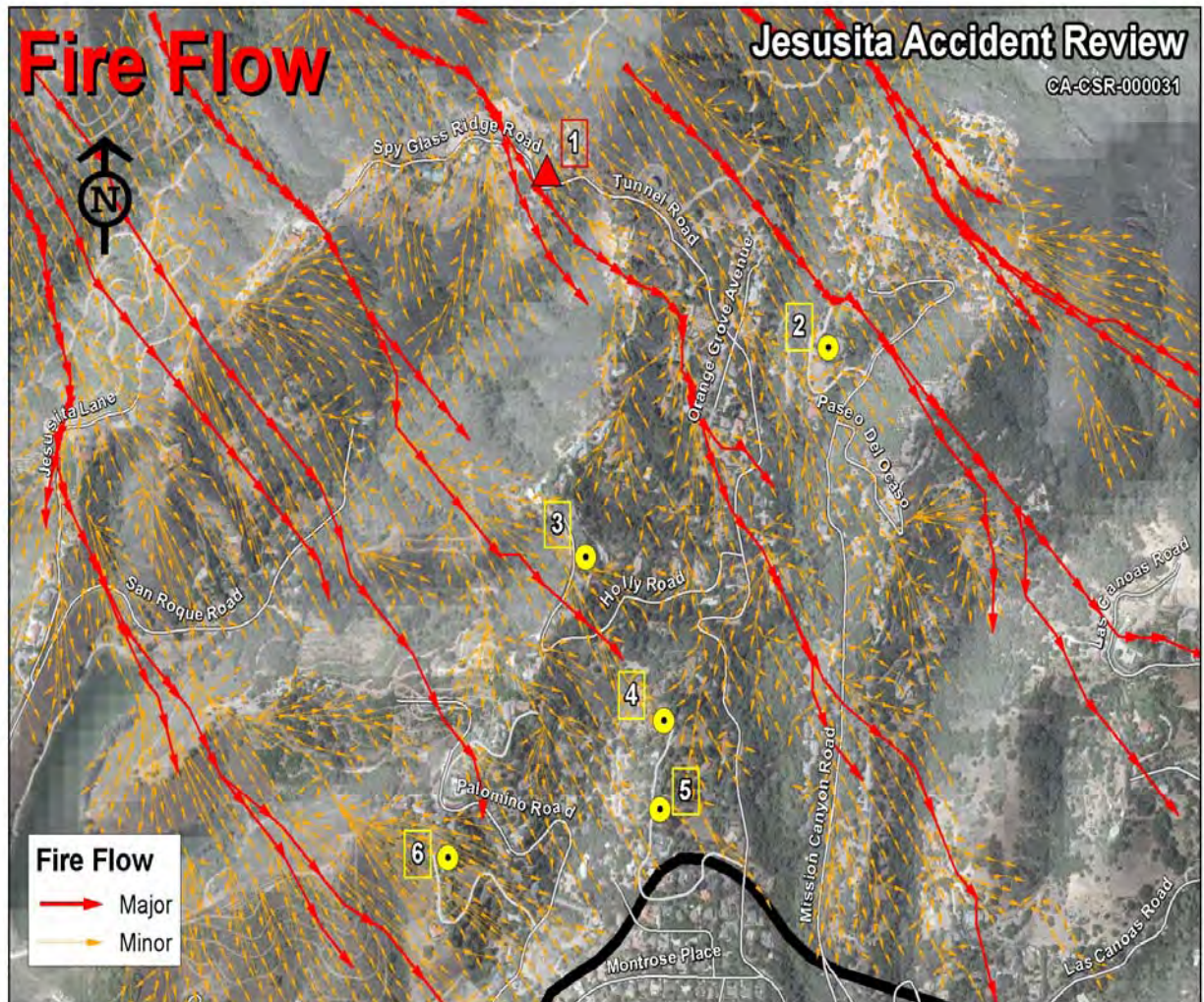
At 4:52 PM, the Operations Section Chief gathered intelligence on the burnover and firefighter injuries to brief the Incident Commander. The Agency Administrators were advised of the burnover and firefighter injuries, and a CAL FIRE Serious Accident Review Team (SART) was requested at 6:00 PM.











## OVERVIEW OF THE SPYGLASS ACCIDENT

### Spyglass Ridge Road

#### **Equipment and Personnel**

##### **Ventura County Department (VNC)**

VNC Engine 54 (E-54) is a 2007 American LaFrance Type I fire Engine. E-54 was staffed with a Fire Captain, a Fire Apparatus Engineer and one Firefighter during the burnover.

VNC Engine 30 (E-30) is a 2004 American LaFrance Type I Fire Engine. E-30 was staffed with a Fire Captain, a Fire Apparatus Engineer and one Firefighter.

Ventura County Fire Department (VNC) Engine Strike Team (ST) 1580A was assigned to the Tunnel Structure Group of the Structure Protection Branch. The strike team moved to the Santa Barbara Mission where an additional safety briefing was conducted by the Tunnel Structure Group Supervisor.

At approximately 9:00 am, VNC ST-1580A was positioned in the Spyglass Ridge Road residential area. A tailgate safety briefing was conducted, and the cul-de-sac at the end of Spyglass Ridge Road was identified as the Safety Zone. The fire was located on the ridge above (North of) their location. Fire behavior was of low intensity as the fire backed downhill against the wind, and was burning in a continuous fuel bed of mature chamise.

Throughout the day the engine crews from VNC ST-1580A performed structure preparation; moved combustible items away from the structures; cleaned out rain gutters; and applied aluminum foil to vent openings. VNC E-54 performed these tasks at their assigned location of 1495 Spyglass Ridge Road. Two hose lines were pre-positioned around the main house. VNC E-54 prepositioned two hose lines. A 100' 1 ½" hose was placed along the West side of the main house, and a 100' 1 ¾" was placed at the bottom of the driveway near the Northwest corner of the main house. Both hose lines were connected to a gated wye for connection to the water supply when needed. Three Self-Contained Breathing Apparatus (SCBA) were also prepositioned inside the living room of the main house.

At approximately 2:01 P.M., VNC E-42, located at the adjacent residence to the West, observed and documented a shift in the wind direction and speed. The winds changed from upslope South-Southwest to across the slope from the

Northwest. Fire activity began to increase on the ridge above their position. The Northwest wind continued to increase, and the fire began to move down slope toward Spyglass Ridge Road.

At approximately 3:35 P.M., FC-54 noticed a spot fire above the location of E-54. At the same time, FF-54 pointed out another spot fire near the Southeast corner of the main house. A 200' 1  $\frac{3}{4}$  hose line was then connected from E-54 to the gated wye to charge the pre-positioned hose lines. FC-54 then radioed STEN 1580A and advised that another fire engine was needed. E-30 moved to assist, and backed in next to E-54.

At approximately 4:00 p.m. the fire made extreme advances towards the Spyglass Ridge Road area. Numerous spot fires caused a condition similar to area ignition around 1495 Spyglass Ridge Road. FC-54 told FF-54 to protect the rear of the main structure. After several minutes of firefighting, FC-54 took FF-54 into the structure, entering through the back door on the Southwest side to wait for the fire to pass. While inside the structure, FF-54 removed his web gear and fire shelter and donned his SCBA. FC-54 also donned his SCBA over his web gear and fire shelter.

As the fire intensity increased, FC-54 radioed STEN-1580A and advised that the FC-54 and FF-54 were in the structure and needed immediate aircraft support. The main house began to burn, and FC-54 and FF-54 moved to various rooms in the house as the fire progressed through the structure. FAE-54 had remained at E-54, and used the engine protection line to protect the engine from the advancing fire.

FAE-54 was trying to make radio communication with FC-54 and FF-54 but no contact was made. FAE-54 again radioed FC-54 and advised him E-54 was out of water. As the fire advanced towards E-30 location, E-30 dropped their hose lines, donned their SCBA's, and took refuge in the cab. E-30 was out of water, and FC-30 told FAE-54 to get in the cab of E-30. With concerns for E-54's crew, he reluctantly jumped into the cab of E-30. With FAE-54 now inside the cab with E-30's crew, they attempted to drive down the driveway to safety but were halted by a wall of flames. E-30 waited for a break in the flaming front then drove down the driveway dragging all their hose and nozzles.

With the majority of the main house burning, FF-54 crouched down and removed the fire shelter belonging to FC-54 and prepared to use it as a heat shield while exiting the structure. Before the fire shelter could be fully opened, the sliding glass door shattered, and a rush of heat entered the room. FC-54 made the decision to leave without using the fire shelter.

As FC-54 and FF-54 exited the structure, FC-54 instantly felt his skin burning. FF-54 fell to the ground as FC-54 ran up the driveway towards E-54. FC-54

thought that FF-54 was attempting to deploy the fire shelter at that location. FC-54 yelled at FF-54 to continue to the fire engine. FC-54 arrived at the fire engine and climbed into the back seat on the passenger side still wearing his SCBA. FC-54 could not locate FF-54 and his low air warning device was sounding on his SCBA.

FC-54 radioed to STEN-1580A and told him that he had returned to the location of E-54. STEN-1580A radioed back and told him that he would come and get him. FF-54 then radioed that he was also back at E-54. STEN-1580A arrived at E-54 and the STEN (T)-1580A placed FF-54 and FC-54 into the rear seat of the vehicle. STEN-1580A drove the injured FC-54 and FF-54 to the residence located at 2845 Spyglass Ridge Road where Paramedic Engine 32 initiated treatment. Both victims were assessed by the Paramedic and a medivac helicopter was requested due to their extensive burn injuries, but could not make access due to the conditions.

Branch I arrived, and was preparing to transport FF-54 along with the Paramedic when a paramedic ambulance escorted by a law enforcement officer arrived. The paramedic ambulance with the injured FC-54 and FF-54, assisted by a FF-Paramedic from ME-32, transported both patients to Cottage Hospital for evaluation. They were subsequently flown to Grossman Burn Center. STEN (T)-1580A was transported by Branch I to Santa Barbara County Fire Station #15 for smoke inhalation injuries. A paramedic ambulance transported STEN (T)-1580A to Cottage Hospital for initial evaluation, and was subsequently flown to Grossman Burn Center. FAE-54 sought treatment for smoke inhalation on May 9, 2009. All structures at 1495 Spyglass Ridge Road were destroyed.

### ***INJURIES:***

VNC Strike Team Leader-Trainee (STEN-T) Fire Captain:

- Smoke inhalation

VNC Engine 54 Fire Captain (FC-54):

- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to both ears, sideburn areas, and forehead.
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to both arms, from the wrist to just above the elbow.
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to the back of right hand
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to left calf

VNC Engine 54 Fire Apparatus Engineer (FAE-54)

- Smoke inhalation

VNC Engine 54 Firefighter (FF-54)

- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to forehead

- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to left side of neck
- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns left ear
- 3 ½ inch laceration to right side of neck below jaw
- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns to both shoulders and upper back
- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> degree burns to triceps area of both arms
- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns to palm of right hand
  - Includes palm side of all fingers

***DAMAGES:***

- VNC E-54 had severe fire damage to the front and left side of the apparatus. The hose bed had major damage from the cribbing and hose that caught fire. The apparatus had a transmission leak along the left frame rail, but was physically driven off the mountain.
- VNC E-30 received minor exterior heat/fire damage.

**SPYGLASS FINDINGS**

**Personnel**

The strike team leader identified and communicated structures as being safety zones.

The area was scouted, structures deemed defendable and a conscious decision was made by the strike team leader and engine company officers to stay and defend structures even with poor escape routes and safety zones.

Lookouts were established and weather was taken throughout the day by members of the strike team.

The incident briefing was attended by the strike team leader and trainee. The entire strike team received briefing which included weather forecast.

### **Access**

Spyglass Ridge Road is a narrow, one lane, paved, dead-end road, without turnouts. It is approximately 14' wide, and native vegetation flanking both sides of the road ending in a cul-de-sac. The driveway to the residence was overgrown.

### **Management**

All company officers had current copies of the Incident Action Plan. The strike team leader attended morning briefing and briefed the strike team.

The Incident Action Plan stated Control Operations for the Mission Structure Group was to "Prep and triage structures which could be threatened by advancing fire."

The Strike Team Leader established a safety zone at the end of the cul-de-sac on Spyglass Ridge Road.

## **CAUSAL FACTOR ANALYSIS**

### **Site Conditions.**

Spyglass Ridge Road and Tunnel Road join, and remain a single lane road creating a potential bottle neck for merging traffic.

1495 Spyglass Ridge Road was also destroyed in the 1962 Coyote Fire.

Narrow driveway overgrown with native vegetation.

Heavy fuel loading at the site which is documented in a video taken at 2:01 p.m. by VNC

### **Human Nature**

Fire behavior intensity was greater than expected.



### **Management**

The Incident Action Plan for May 6, 2009 stated the control objectives, for the Mission Structure Group, as “Prep and triage structures which could be threatened by advancing fire.”

### **Contributing Factors**

The spot forecast provided by NOAA and included in the Incident Action Plan called for Gusty Sundowner Winds to surface at approximately 8:00 PM on the evening of May 5, 2009. This same weather forecast was used in the IAP for May 6, 2009

The Sundowner Winds on May 6, 2009 surfaced and increased earlier then expected. This may have been a factor because the weather discussion in the IAP was for the previous day.

The cul-de-sac at the end of Spyglass was inadequate size to be considered a safety zone for the entire strike team. With flame heights of 100', The Incident Response Pocket Guide recommends a safety zone with a distance separation of 400' from firefighters to flame.

Structure defense tactics were not well identified on the IAP for May 6, 2009. I-Zone tactics and safety watch outs were not identified on the IAP.

The PPE and under garments worn by the injured firefighters were analyzed and a full report is included in this document.

The PPE worn by the injured Fire Captain consisted of single layer nomex over a cotton short sleeve t-shirt, cotton gym shorts with nomex pants. The burns were to both elbows and his left calf in the single layer nomex area.

The PPE worn by the injured Firefighter was double layer for all areas except for a single layer nomex over cotton short sleeve t-shirt; the burns were to both triceps' between the t-shirt line and the wrist.

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

The location of the residence as it sits at the top of three drainages, with heavy fuel loading and numerous structures and out buildings caused the fire behavior to greatly increase.

The orientation of the structures and vegetation caused the fire to funnel up the driveway which was also the escape route back to VNC E-54.

The IAP should identify what is to be done for the entire operational period. I.E. "...retreat to safety zone if needed".

## **Recommendations**

Safety zones must be large enough to allow for the fire to pass without the need for additional protection and be able to accommodate all firefighters and apparatus.

Provide for enough reflex time for firefighters to reach the safety zone.

Structures should not be considered safety zones. They are survival zones to only be used as a last resort.

Do not allow the time of year to influence tactical decisions. Base all actions on current, observed, and predicted fire behavior.

Providing structure defense during passage of a flaming front should be considered a frontal assault and is one of the eighteen situations that shout watch out.

Be alert for changing conditions and adjust tactics and LCES measures to meet new levels of risk.

Continued analysis of double layered PPE vs. single layered PPE.

## **Site Conditions**

The house was approximately forty seven years old. It is situated at the top of Spyglass Ridge Road and has three drainages running towards the residence. The house is a single story, single family dwelling with a flat roof, and stucco siding. The native vegetation was cleared to between fifteen and thirty feet with ornamental plants between. A stand of mature Eucalyptus trees is to the south, and the driveway to the residence was overgrown.

The location of the residence as it sits at the top of three drainages, with heavy fuel loading and numerous structures and out buildings caused the fire behavior to greatly increase.

The orientation of the structures and vegetation caused the fire to funnel up the driveway which was also the escape route back to VNC E-54.

LE-100 inspections were not available for the 1495 Spyglass Ridge address for 2008, and inspections for 2009 had not been started.

## **SUPPORTING DATA**

### **Spyglass interview STEN-T**

I made it pretty clear to the Strike Teams that there was a choke point partway down Tunnel Road and escape routes were not a reasonable part of the plan. And just right up front if anything goes wrong on that road your escape route is done and if you were dependent upon it you've got problems. Uh, I also made it pretty clear that I didn't see any really good safe - uh, safety zones by definition in the area. So everyone that was on that assignment realized that they were going to be in the area as the fire went through. (STEN-T Line 164)

### **Escape Routes/Safety Zone**

### **Spyglass interview with STEN**

Did you have a designated lookout for your Strike Team?  
(Question by Gaines Lead Investigator)

I had, uh, two or three of them. I had Engine Company 57, which would be the eastern side of our, uh, area of responsibility. I had 42; which was midway and then 32 and ourselves we were more roving up and down, 32 was the far westside. (STEN Line 166) **Lookouts**

Did you have designated safety zones? (Question by Gaines Lead Investigator)

We, uh, that's a good question, I'm not sure if we ever mentioned the cul-de-sac as a safety area for each engine company or not. (STEN Line 231) **Safety Zone**

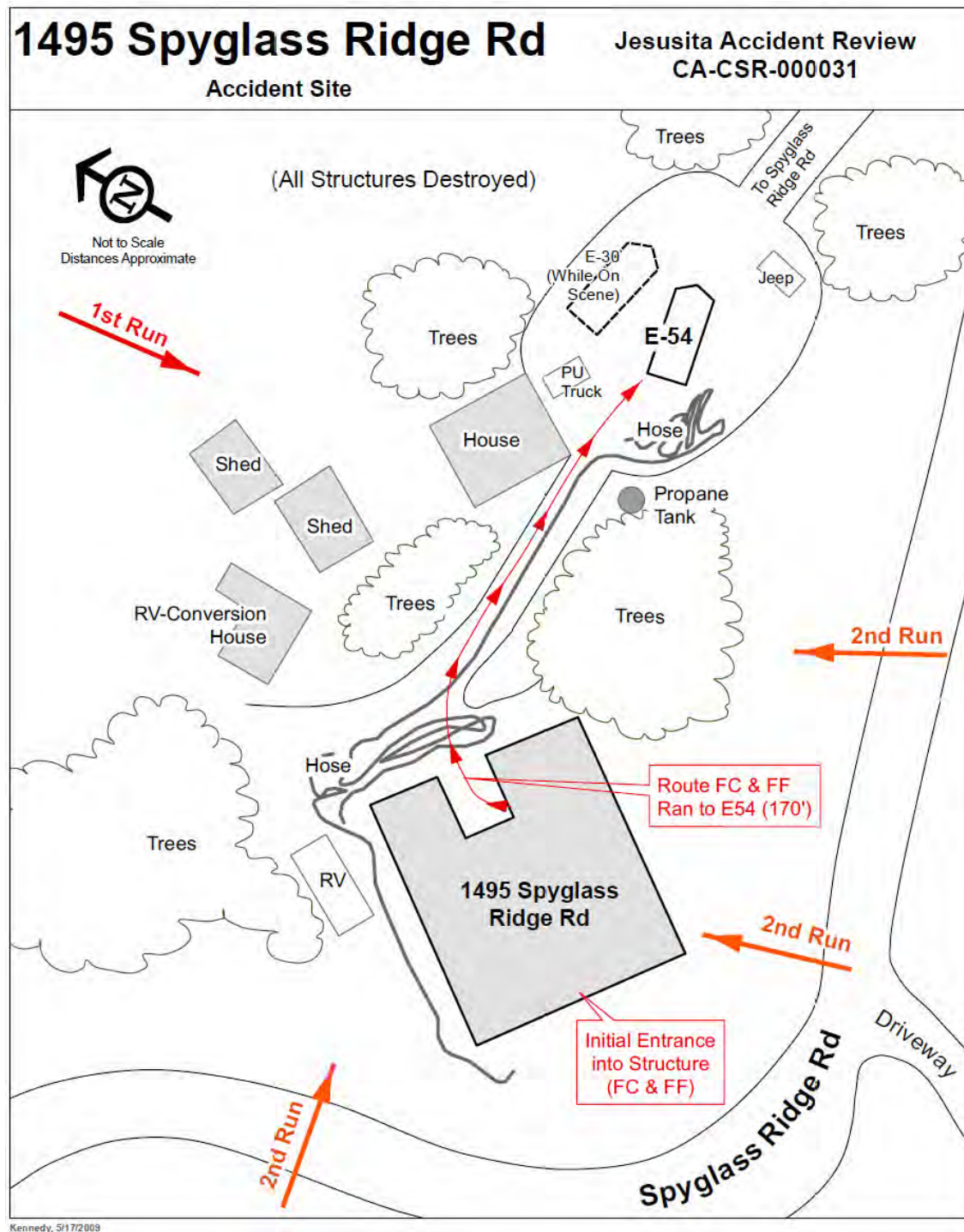
Do you know if that was on the assigned division tac or was it on your Ventura tac? (Question by Gaines Lead Investigator)

It was on our Ventura tac. We talked about our radio I - I spent a moment on our radio or com plan. Our Type I engines have one King radio per engine. All personnel carry a radio. And, uh, radios that we carry are MT 2000's will not get the frequencies that were being used on this incident. So the captains have the King radio with the incident tac. (STEN Line 409) **Communications**

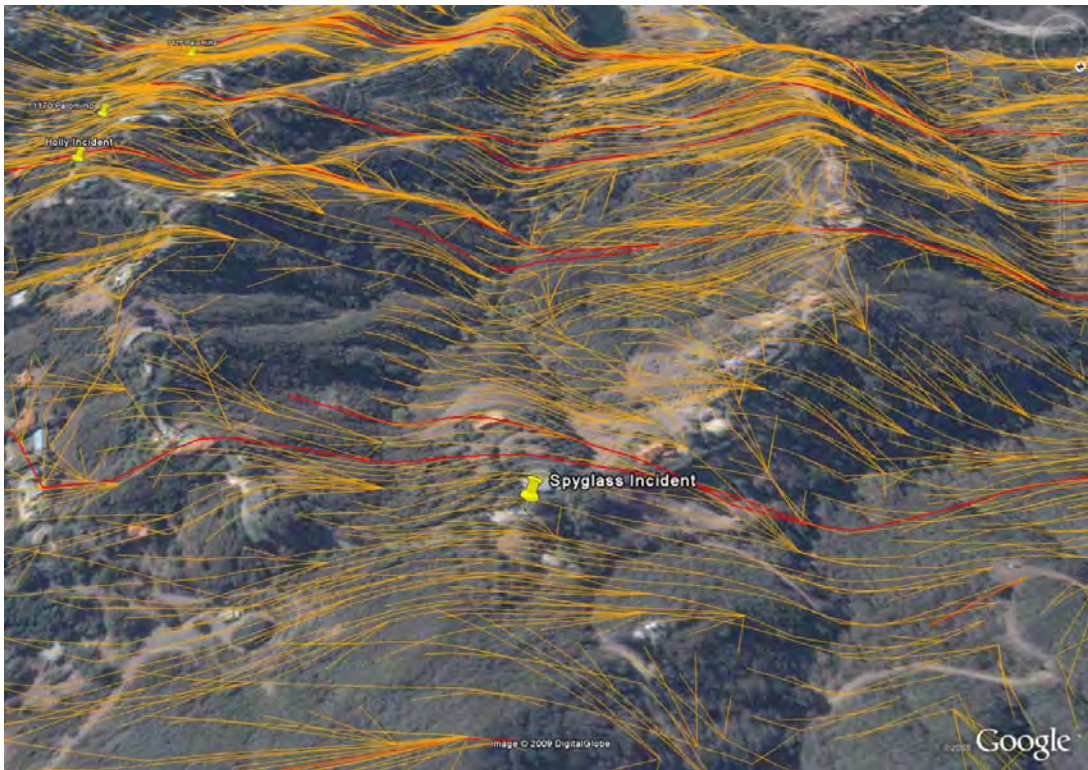
FF Lopez- using the structure and putting in the SCBA's

Yeah, you know, remember the (Esperanza)," and we were- it was kind of like little small talk like that. And we thought, yeah we don't want, you know, to get into that. And then we kind of all agreed that- that let's, um, why don't we put those BAs in that last house. And that would be, um, that would be- our thought was that would be the last house that would get engaged in the fire.(FF 54 Line 293)

A full PPE report is located in this document which outlines the approx. exposure temperatures, and condition of the burned nomex. (page 69)







Fire path at 1495 Spyglass Ridge Road



1495 Spyglass Ridge Road





1495 Spyglass Ridge Accident site



1495 Spyglass Ridge Road prior to the burn over.

## OVERVIEW OF THE MISSION ACCIDENT

## **Mission Canyon Road**

### **Equipment and Personnel:**

#### **Los Angeles County Fire Department (LAC)**

LAC Engine 149 (E-149) is a 1995 KME Type I Fire Engine. E-149 was staffed by a Captain, a Fire Apparatus Engineer, and two Firefighters.

On Wednesday May 6, 2009 Los Angeles County Fire Department (LAC) ST-1241A was assigned to the Mission Structure Group. The entire strike team was briefed by STEN-1241A, and staged in the Botanical Gardens in Mission Canyon. STEN-1241A preformed a reconnaissance of upper Mission Canyon Road and deployed the engines to protect structures in the northern end of Mission Canyon Road. STEN-1241A provided a safety briefing identifying the structures and a graded lot below 1433 Mission Canyon Road as safety zones. E-149 was assigned the structure located at 1433 Mission Canyon Road, backed into the driveway, and deployed two 1" reel-lines to the entrance of the driveway and front of the house.

At approximately 3:00 PM the wind transitioned from an upslope southerly direction to a down canyon northerly direction and increased substantially. The head fire made a run down the Mission Canyon Drainage toward 1433 Mission Canyon Road. Spot fires developed around the structure. At approximately 3:40 PM conditions deteriorated more then anticipated. At approximately 3:55 PM, due to strong winds, intense heat and poor visibility, FC-149 called for the crew to retreat into the structure. Accountability was conducted and STEN-1241A was notified via radio.

The engine crew entered the structure twice to avoid heat and once to get out of the smoke. One firefighter suffered heat related symptoms and moderate respiratory distress. He was transported to Cottage Hospital by STEN-1241A, kept overnight for observation and released the next day. The engine sustained damage to a hose reel and ladder protectors. The house received minor damage.

#### ***INJURIES:***

LAC Engine 149 Firefighter (FF-149)

- Heat exhaustion and smoke inhalation

#### ***DAMAGE:***

LAC E-149 had the ladder cover with heat/fire damage.

## **MISSION FINDINGS**



### **Personnel**

The strike team leader identified and communicated structures as being safety zones.

The area was scouted, structures deemed defensible and a conscious decision was made by the strike team leader and engine company officers to stay and defend structures even with poor escape routes and safety zones.

Lookouts were established and weather was taken throughout the day by members of the strike team.

The incident briefing was attended by the strike team leader and assistant. The entire strike team received a briefing which included weather forecast.

### **Access**

Mission Canyon Road is a narrow, two lane, paved, dead-end road, without turnouts. It is approximately 18' wide, with many power-lines crossing it and significant amounts of native vegetation flanking both sides of the road

The 1433 Mission Canyon property is accessed from a private, single lane, paved road with an average width of 11 feet. The house is located approximately 710' northwest of Mission Canyon. The private road continues north for another 503' and reconnects with Mission Canyon Road.

### **Management**

All company officers had current copies of the Incident Action Plan. The strike team leader attended morning briefing and briefed the strike team.

The Incident Action Plan stated Control Operations for the Mission Structure Group was to "Prep and triage structures which could be threatened by advancing fire."

Structure defense tactics were not well identified on the IAP for May 6, 2009. I-Zone tactics and safety watch outs were not identified on the IAP.

The structure group supervisor established and communicated a trigger point, at which time all resources were to “pull out” when the fire crossed Tunnel Road. The safety zone was at Foothill and if it was congested resources were to move toward highway 154.

The area of Mission Canyon Road was sized up and scouted by the structure group supervisor and the strike team leader.

## **CAUSAL FACTOR ANALYSIS**

### **Site Conditions.**

Tunnel Road and Mission Canyon join north of Foothill Lane creating a potential bottle neck for merging traffic.

1433 Mission Canyon Road was also destroyed in the 1962 Coyote Fire.

LE-100 inspections were not available for this address and inspections for 2009 had not been started.

### **Human Nature**

Engaging in structure protection with the preconceived idea that “you will not lose structures”, compromises situational awareness.

The fire was described, throughout the day, as “Punking around” and as an innocent looking backing fire by many members of the strike team, including the strike team leader trainee.

Fire behavior intensity was greater then expected.

### **Management**

The structure group supervisor established a trigger point for firefighters to leave the area of Mission Canyon and meet at Foothill Lane and Lacumbre. Leaving the area was not considered a viable option by the strike team leader.

The Incident Action Plan for May 6, 2009 stated the control objectives, for the Mission Structure Group, as "Prep and triage structures which could be threatened by advancing fire."

The IAP should identify what is to be done for the entire operational period. I.E. "...retreat to safety zone if needed".

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

### **Contributing Factors**

The spot forecast provided by NOAA and included in the Incident Action Plan called for Gusty Sundowner Winds to surface at approximately 8:00 PM on the evening of May 5, 2009.

The IAP did not identify the winds for May 6, 2009 which was the day of the accident. The Sundowner Winds surfaced and increased earlier then expected.

A graded dirt lot was identified by the members of the strike team as an alternate safety zone. The lot measured approximately 126' by 123'. The flame lengths were described by the engine captain and structure group supervisor to be in excess of 100'. With flame heights of 100', The Incident Response Pocket Guide recommends a safety zone with a distance separation of 400' from firefighters to flame.

Two-1" reel lines were pulled to defend this structure. This would not give adequate water flow to defend a structure or advancing wildland fire. A minimum of 1.5 or 1.75 line should be used for structure protection with a 1.5- 1.75 engine protection line.

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

## **Recommendations**

Safety zones must be large enough to allow for the fire to pass without the need for additional protection and be able to accommodate all firefighters and apparatus.

Provide for enough reflex time for firefighters to reach the safety zone based on road conditions, weather, fire behavior and other hazards.

Structures should not be considered safety zones. They are survival zones to only be used as a last resort.

Do not allow the time of year to influence tactical decisions. Base all actions on current, observed and predicted fire behavior.

Providing structure defense during passage of a flaming front should be considered a frontal assault and is one of the eighteen situations that shout watch out.

Be alert for changing conditions and adjust tactics and LCES measures to meet new levels of risk.

Use the appropriate size of attack line according to dept. policy.

Situational awareness was compromised during firefighting operations by taking photographs.

Development of a cell phone/video policy during emergency incident operations.

## **Site Conditions**

The house was approximately forty years old. It is situated on a south face ridgeline. The house is a single story, single family dwelling with a tile roof, boxed eaves and stucco siding. The native vegetation was cleared to between fifteen and thirty feet with ornamental plants between. A stand of mature Eucalyptus trees is to the north and the Mission Canyon drainage immediately to the west.

1433 Mission Canyon Road was also destroyed in the 1962 Coyote Fire.

LE-100 inspections were not available for this address and inspections for 2009 had not been started.

## **Supporting Data**

### **Mission Interview Structure Branch Dorn**

I know that, ah, the group sups in there had some preset stuff and were moving some of the folks. And I understand that, ah, there were a couple of triggers points that were established, ah, especially for the Mission group. Ah, one was if we lost air support. The other was if we had a running fire as opposed to a backing fire. And, ah, it was primarily for the folks, ah, up on the top ends where they were, you know, a little more exposed to the brush area. (Ranger Dorn Line 350) **Trigger point to leave area**

### **Mission Interview STEN Buchanan**

Couldn't really tell if it was an – an improved road or not. And um, but that seemed to be the – the trigger point, that if it slopped over that and stuff and we got a down canyon wind that it'd be time to – to go and stuff. And then we had basically had everything coming here and then around, yeah. So uh, that was kind of the um, discussion was the trigger points was that – was that road there. (Buchanan Line 352) **Trigger point to leave area**

We looked at uh, safety zones. In fact, on that um, on the disc that I gave ya and stuff there's a – one we identified as great safety zone. In fact, that's where the division sup ended up parking himself, in that um, little spot there. (Buchanan Line 447) **Safety Zones**

The main lookout was at – was at that house I was telling you about that had the great deck there. Awesome. Provide us a little opportunity to put our feet up for a bit. (Buchanan Line 474) **Lookout**

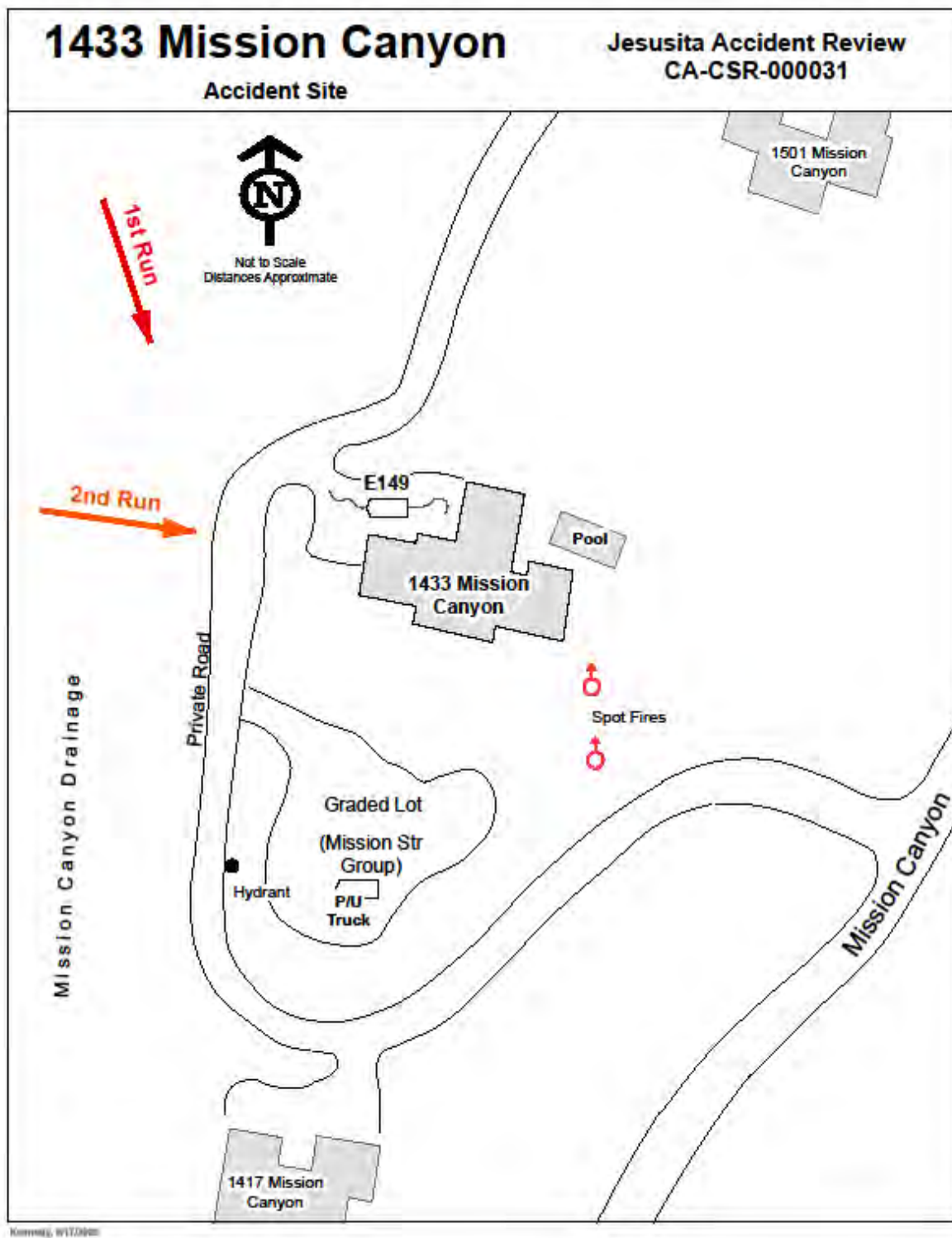
We were working off the NIFC that day? It was either NIFC or um, OES white two or three. And then we were staying with our own internal Tac channel between the companies and Captain. And then the Captain and myself had a radio that we could talk to on our own command channel. (Buchanan Line 535) **Communications**

What was supposed to occur when the fire passed that mid-slope road? The (Tunnel) Road there? (Conoscente Investigator) Talking about the trigger point.

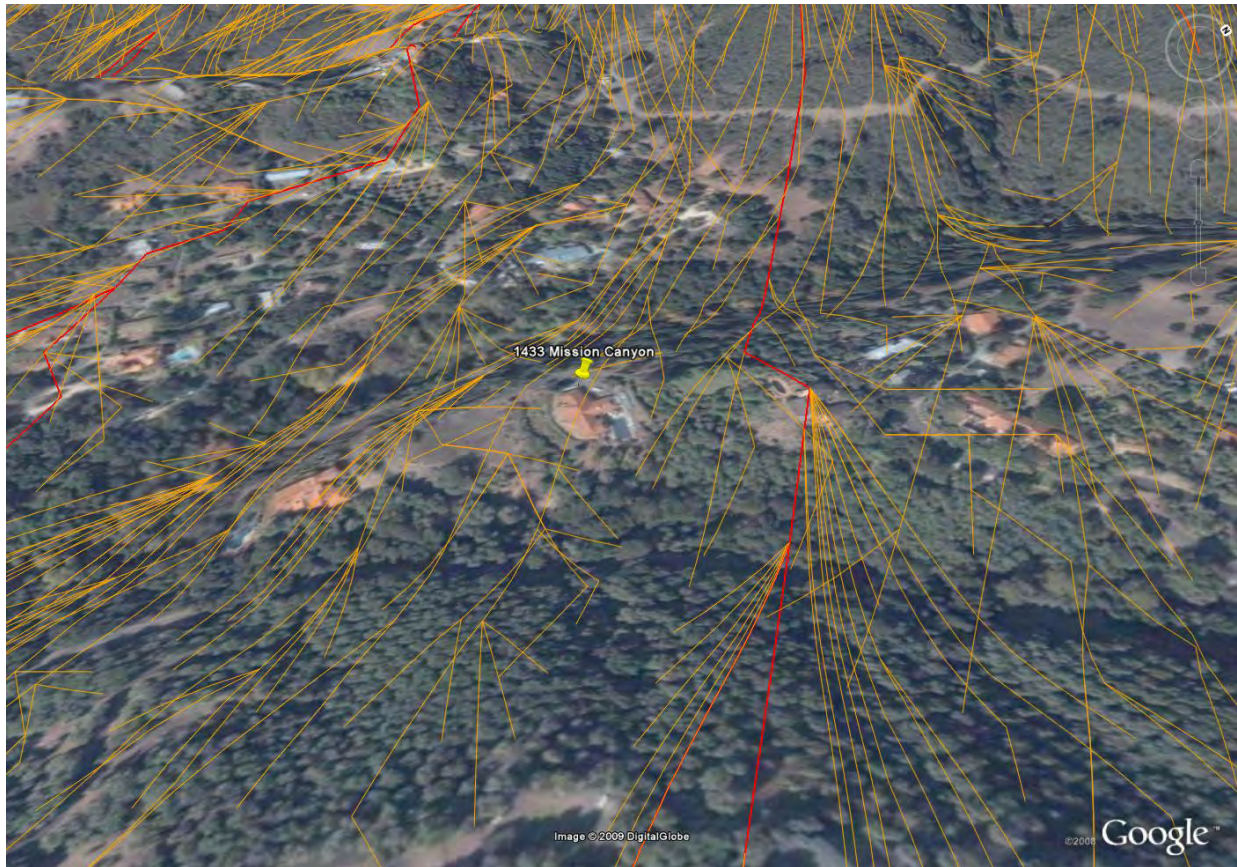
Pretty much, according to all the strike team leaders was everybody was supposed to mount up head to (Foothill) Boulevard. And I believe they said let's meet on (Foothill) just west of (Lacumbra)? (Buchanan Line 718) **Trigger point**



Firefighter at 1433 Mission accident site receiving breathing treatment.







Fire path at 1433 Mission Canyon

Fire was coming from the northwest, from top to bottom in the photo





Propane tank venting at the 1433 Mission Canyon accident site



View of 1433 Mission Canyon earlier in the day

## **OVERVIEW OF THE HOLLY ACCIDENT**

### **Holly Road**

#### **Equipment and Personnel:**

##### **Los Angeles City Fire Department (LFD)**

LFD Battalion 18 (B-18) is a 2007 Chevy Suburban. B-18 was staffed with a Battalion Chief and a Firefighter-Staff Assistant.

LFD Utility 33 (U-33) is a 2003 Ford Crew-cab two-wheel-drive pick-up truck. Utility 33 was staffed by a Battalion Chief.

On Wednesday, May 6, 2009, Los Angeles Fire Department (LFD) ST-1001A was assigned to Tunnel Structure Group. STEN-1001A was given a tour of the area by the Tunnel Structure Group Supervisor, and at 11:00 AM returned to brief the crews and give out assignments. Engines were in place at their locations at approximately 11:30 A.M. E-14 was assigned as a roving engine for ST-1001A and was the lookout for Holly Road.

At approximately 2:50 P.M., the winds began to increase and turn down slope. At approximately 3:00 P.M. the winds were periodically gusting at an estimated 40 to 60 miles per hour; according to the crew of E-14 at the top of Holly Road. E14 requested more engines for assistance on Holly Road because of the large amount of unprotected structures and change in weather.

At approximately 3:45 P.M., lead by B-18 and U-33, E-35 drove up Holly Road to the turnaround at 2910. E-35 noticed a spot fire in the north drainage beyond 2911 Holly Road. Shortly after that, the ridge area surrounding Holly Road where E-14, E-35, STEN-1001A, STEN(T)-1001A and their staff assistant was located experienced multiple spot fires, which led to extreme fire behavior resulting in multiple fire fronts moving through the area. During the same time the hydrant system in the area lost water.

STEN-1001A immediately gave the order to take refuge. STEN-1001A, STEN(T)-1001A, FAE-14, one firefighter from E-14, FAE-35, and 5 civilians took refuge in the residence at 2910 Holly Road. FC-35 and two Firefighters from E-35 took refuge in the structure located at 2911 Holly Road as their escape route was blocked. FC-14 and one firefighter from E-14 took refuge in the structure located at 2931 Holly Road. They decided the structure would not withstand the fire, and moved to 2921 Holly Road. They took refuge for approximately 15-20 minutes, and when conditions permitted, made their way to 2910 Holly Road with the other personnel.

The Staff Assistant originally took refuge in a structure at 2850 Holly Road and moved to the garage after the front window gave way and the fire moved into the house. The staff assistant moved to the home at 2910 Holly Road when conditions permitted. Eight fire personnel took refuge at 2910 Holly Road and

remained there with the five civilians for approximately 20 additional minutes. Structure PPE and 5 SCBA's were brought inside 2910 Holly Road as a precaution when the windows cracked due to the fire. The three fire personnel from E-35 took refuge in the home at 2911 for the entire fire siege.

During the entrapment, accountability reports were made via a LFD tactical frequency with all the engine crews involved with STEN-1001A. The Crews of E-14 and E-35 resumed firefighting operations after the fire had passed and located additional water sources. LFD Command Vehicle B-18 and U-33 were parked in the driveway at 2850 Holly Road and were destroyed by fire. STEN-1001A experienced debris in both eyes, and was treated and released at a local hospital. Structures at 2931 Holly Road, 2921 Holly Road, 2850 Holly Road were destroyed.

### **INJURIES:**

Strike Team Leader (STEN) Battalion Chief

- Severe eye irritation

### **DAMAGES:**

- LFD B-18 was completely destroyed.
- LFD Utility 33 was completely destroyed.

## **HOLLY FINDINGS**

### **Personnel**

The area was scouted, structures deemed defensible and a conscious decision was made by the strike team leader and engine company officers to stay and defend structures even with poor escape routes and safety zones.

The area of Tunnel Road was sized up and scouted by the structure group supervisor, strike team leaders, and captains on the engines prior to them engaging.

The crews did not receive any local maps for the area.

The strike team leader did not have an incident tactical radio.

### **Access**

Tunnel Road is a narrow, two lane, dead-end road, without turnouts, surrounded by heavy vegetation with numerous power lines crossing it.

The Holly Road ridge line is accessed by a private, single lane narrow mid-slope dead end driveway without turnouts, surrounded by heavy vegetation and very little clearance. The turnaround at 2910 Holly Road feeds three driveways and approximately 7 homes.

### **Management**

The strike team leader allowed crews to have lawn chairs out and have gear off until he told them to “snuggle it up” (Meaning get ready)

The strike team leader communicated to his crews they were to find a defensible structure and prep the structure because they had no plan to leave the area due to narrow roads and limited access.

Engine 14 was established as a roving lookout on Holly Road and then became stationary when the Type 3 Strike Team left the area.

Engine 35 moved up to Holly Road, an area where they were unfamiliar with terrain, strategy, and tactics. The safety zones and escape routes were not identified. Shortly after their arrival they were overrun by fire and had to take refuge in 2911 Holly Road. The engineer off E-35 was cut off from his crew and had to take refuge in 2910 Holly Road.

The Incident Action Plan stated Control Operations for the Tunnel Structure Group was “Prep and triage structures which could be threatened by advancing fire.”

No trigger point or safety zone was established or communicated by the Tunnel Structure Group or by the strike team leader.

## **CAUSAL FACTOR ANALYSIS**

### **Human Nature**

The fire was described, throughout the day, as “a lazy fire”, which was not doing anything by the lookout, E-14 (Line 135).

### **Site Conditions**

Holly Road is a single lane, paved, dead-end ridge top road, approximately 18’ wide. Significant amounts of native vegetation flanked both sides of the road.

### **Management**

Engine 35 moved up to Holly Road, an area where they were unfamiliar with terrain, strategy, and tactics. The safety zones and escape routes were not identified. Shortly after their arrival they were overrun by fire and had to take refuge in 2911 Holly Road. The engineer off E-35 was cut off from his crew and had to take refuge in 2910 Holly Road.

No trigger points were established for firefighters to leave the area.

The strike team leader’s and structure protection group leader’s mindset was to stay and defend.

The Incident Action Plan for May 6, 2009 stated the control objectives, for the Mission Structure Group, as “Prep and triage structures which could be threatened by advancing fire.”

The IAP should identify what is to be done for the entire operational period. I.E. “...retreat to safety zone if needed”.

The wearing of SCBA’s may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

## **Contributing Factors**

The spot forecast provided by NOAA and included in the Incident Action Plan called for Gusty Sundowner Winds to surface at approximately 8:00 PM on the evening of May 5, 2009.

The IAP did not identify the winds for May 6, 2009 which was the day of the accident. The Sundowner Winds surfaced and increased earlier then expected.

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

## **Recommendations**

The IAP should identify what is to be done for the entire operational period. I.E. "...retreat to safety zone if needed".

Provide for enough reflex time for firefighters to reach the safety zone based on road conditions, weather, fire behavior and other hazards.

Safety zones must be identified and be large enough to allow for the fire to pass without the need for additional protection and be able to accommodate all firefighters and apparatus.

Structures should not be considered safety zones. They are survival zones to only be used as a last resort.

Do not allow the time of year to influence tactical decisions. Base all actions on current, observed and predicted fire behavior.

Providing structure defense during passage of a flaming front should be considered a frontal assault and is one of the eighteen situations that shout watch out.

## **Site Conditions**

The house at 2910 Holly Road was approximately ten years old. It is situated on a north - south aligned ridgeline. The house is on the east side of the ridge. The house is a two story, single family dwelling with a tile roof, stucco siding and had no eaves. The native vegetation was cleared 30 feet on the east with ornamental plants between. Holly Road separated the home from the chimney canyon to the west.

The house at 2911 Holly Road was approximately 30 years old. It is situated on a north – south aligned ridge. The house is on the west side of the ridge on a spur ridge. The house is a single story family dwelling, with rolled roofing, wooden sided and exposed to the slope. The native vegetation was cleared 30-100 feet around the structure.

The house at 2850 Holly Road was destroyed by the advancing flaming front. The residence is located at the top of a major drainage and was exposed to direct flame contact. This was the original refuge site prior to it burning down and the firefighters ran to the residence at 2910 Holly road.

The construction type and age of the residence was similar to the residence at 2910 Holly Road.

## **Supporting Data**

### **Holly Interview STEN 1101A Lydecker**

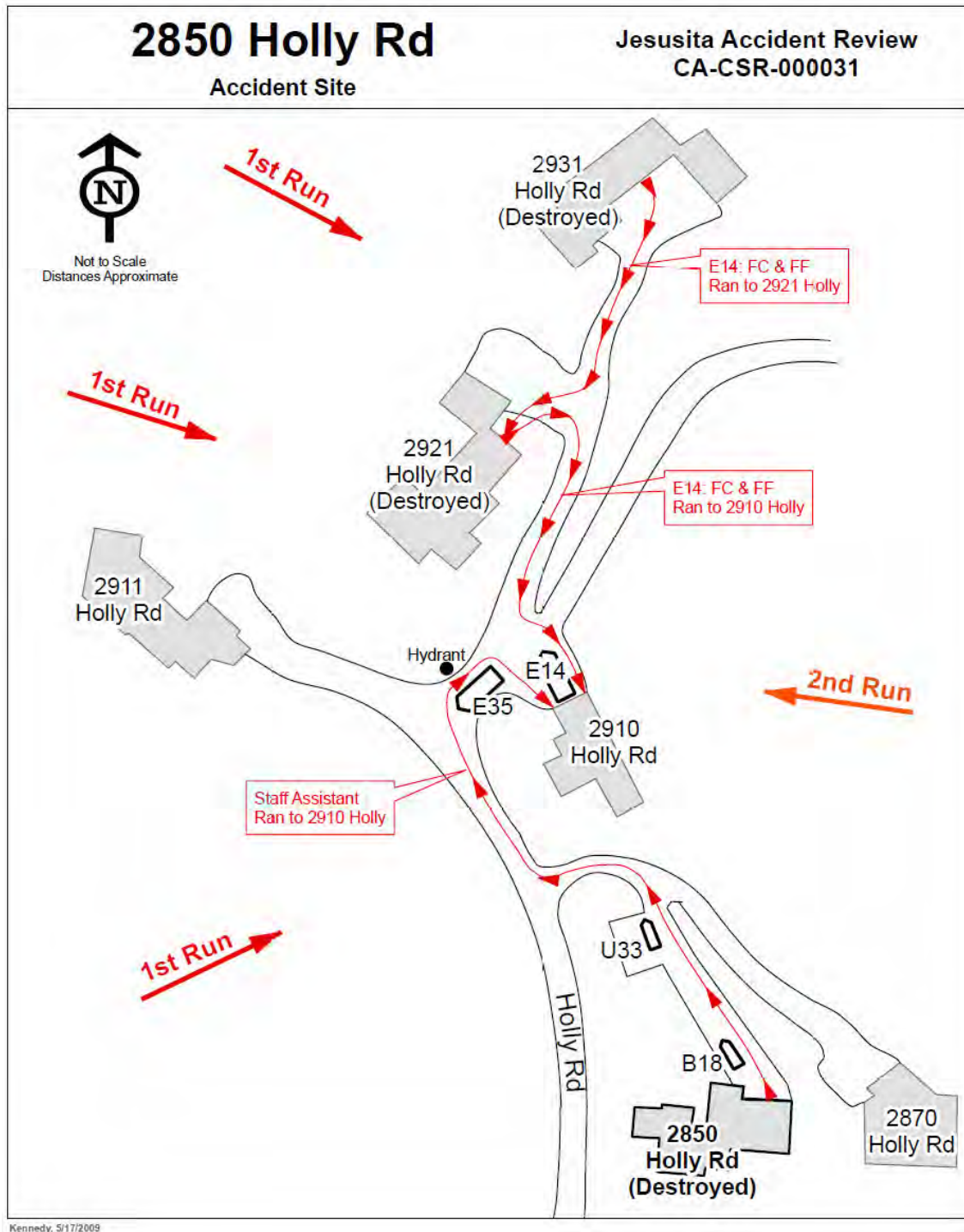
Couple of the guys had their chairs out. You know, I told them, I said, “You can take your brush jackets off.”

You know, earlier in the day, “Stay cool, keep them close, you know, but you can stay-stay hydrated and all that stuff, but I’ll let you cool off for a little bit.” At some point I got on the radio, I told everybody to snuggle it up.(Lydecker Line 800)

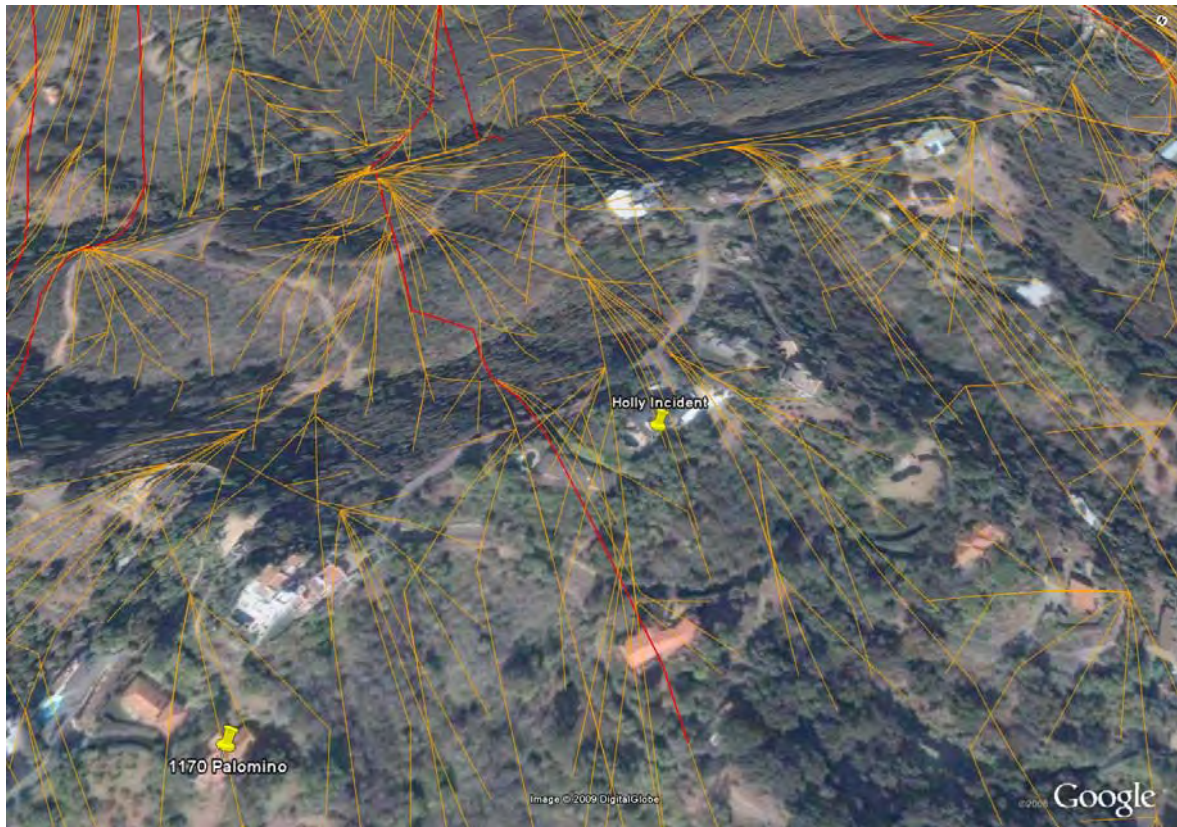
### **Holly interview with Ullrich dealing with the public trying to evacuate too late**

And the man comes up and he goes, “No we leave now.” I said, “You cannot leave.” And, uh, I said, “You - you have to stay here. You’ve had two days to evacuate. You - you’re staying.” And he said, “No - no, we can make it. We’re leaving now.” I said, “No, you’re not.” “Get out of the way.” And he tells her to drive - he says, “Drive...(Ullrich Line 575) **IRPG Pg #11 Wildland –Urban watch-outs**

That - that's a sick feeling. Uh, we started to realize, uh, you know, what? We might not make it out of here. I mean, we talked about you guys, we're - we're in a bad spot. ...(Ullrich Line 865) **Taking refuge in a residence, Wildland/Urban Interface #E**







Fire path at Holly accident site.

Fire came from the northwest, from top to bottom in the photo.



LFD Battalion 18 vehicle at 2850 Holly Road (STEN 1001A)





LFD Utility 33 at 2850 Holly Road. (STEN-T 1001A)

## OVERVIEW OF THE TUNNEL RD “E & G” ACCIDENT

### Tunnel Road

#### **Equipment and Personnel:**

##### **Santa Paula City Fire Department (SPA)**

SPA Engine 81 (E-81) is a 2001 Ferrara Type I Fire Engine. E-81 was staffed by a Captain, a Fire Apparatus Engineer, and one Firefighter.

##### **Ventura City Fire Department (VEN)**

VEN Medic Engine 5 (ME-5) is a 2000 Seagrave Type I Fire Engine. ME-5 was staffed by a Captain, a Fire Apparatus Engineer and two Firefighters.

On May 6 at approximately 7:30 AM, Ventura County Operational Area (XVE) ST-1550A was assigned to the Tunnel Structure Group. Santa Paula City Engine E-81 performed structure triage at 1165 Tunnel Road #E. At approximately 4:00 P.M., E-81 experienced heavy spotting from the East and West. FC-81 gave the order to apply Class A foam directly to E-81 for protection from the extreme heat. FC-81 directed self contained breathing apparatus from E-81 to be placed by the side entrance of 1165 Tunnel Road #E. After 2 to 3 minutes FC-81 gave the order to take refuge in the residence. After entering the residence the decision was made to move E-81. The FAE-81 and FF-81 each donned a SCBA and repositioned E-81. When the fire front passed the crew from E-81 met with Ventura City Engine ME-5, and XVE STEN-1550A to debrief. No firefighters were injured.

The engine received minor damage to the left rear upper equipment compartment while being repositioned. The crew from E-81 returned to firefighting duties and completed their shift. No injuries resulted. Minor Damage occurred to the wall at 1165 Tunnel Road #E from the contact with E81.

Medic Engine 5 (ME-5), also part of XVE ST-1550A, performed structure triage at 1165 Tunnel Road #G. At approximately 4:00 P.M., ME-5 also experienced numerous spot fires from all directions. FC-5 gave the order to don SCBA, and continue firefighting. After the crew went through one and a half bottles of air, the crew from ME-5 experienced zero visibility and extreme heat. FC-5 gave the order to take refuge in ME-5. When inside ME-5, FC-5 gave the order to remove fire shelters from their cases. FC-5 opened his fire shelter and placed it on the dash board of the engine to deploy as a heat shield if needed. Radio contact was made with XVE STEN-1550A, and told of their situation. FC-5 gave the order to

move to the location of E-81 where they were briefed by XVE STEN-1550A. All firefighters were uninjured and resumed their firefighting duties.

Out buildings were destroyed at 1165 Tunnel Road #G. The main structure received minor damage. All structures were destroyed at 1165 Tunnel Road # A and 1255 Tunnel Road.

### ***INJUIRES:***

None Reported

### ***DAMAGE:***

SPA E-81 received damage to the left rear upper compartment door and the body had scraping damage consistent with striking a concrete wall. The chrome bezel around the left rear stop, turn signal and back up light assemblies had scrape damage.

## **TUNNEL FINDINGS**

### **Personnel**

The area was scouted, structures deemed defendable and a conscious decision was made by the strike team leader and engine company officers to stay and defend structures even with poor escape routes and safety zones.

The area of Tunnel Road was sized up and scouted by the structure group supervisor, strike team leaders, and captains on the engines prior to them engaging.

The crews did not receive any local maps for the area.

### **Equipment**

The engine did not have an ember screen installed in the motor air intake system.

### Access

Tunnel Road is a 18 foot wide, two lane, dead-end road, without turnouts, surrounded by heavy vegetation with numerous power lines crossing it.

1165 Tunnel is a private, single lane narrow dead end driveway without turnouts, surrounded by heavy vegetation and very little clearance. Address numbers E and G are at the end of 1165 Tunnel.

### Management

The strike team leader communicated to his crews they were to find a defensible structure and prep the structures.

ME-5 prepped the structure at number #G and E-81 prepped the structure at number #E. The safety zones and escape routes were not identified.

Approximately 5 hours after their arrival both Engine were over run by fire. ME-5's crew had to don breathing apparatus due to intense and fire, they also removed their Fire Shelters from their cases to use as heat shields in ME-5's windows, if needed.

E-81's crew took refuge in the Structure at number E, because of intense heat and fire. The Engineer and Firefighter had to don breathing apparatus to exit the structure to move E-81 to a location away from the intense heat.

The IAP should identify what is to be done for the entire operational period. I.E. "...retreat to safety zone if needed".

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

A trigger point to move to a safety zone was not established or communicated by the Tunnel Structure Group or by the strike team leader.



## **CAUSAL FACTOR ANALYSIS**

### **Human Nature**

The fire was described, throughout the day, as not doing much.

### **Site Conditions**

Tunnel is a single lane, paved, dead-end road, approximately 18' wide. Significant amounts of native vegetation flanked both sides of the road.

### **Management**

ME-5 and E-81 were not familiar with the fire area and, no trigger points were established for firefighters to leave the area.

The strike team leader's and structure protection group leader's mindset was to stay and defend.

The Incident Action Plan for May 6, 2009 stated the control objectives, for the Mission Structure Group, as "Prep and triage structures which could be threatened by advancing fire."

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

Do not allow the time of year to influence tactical decisions. Base all actions on current, observed and predicted fire behavior.

## **Contributing Factors**

The 2008 LE-100 inspections for this property show that it failed. 2009 LE-100 inspections had not been started.

The spot forecast provided by NOAA and included in the Incident Action Plan called for Gusty Sundowner Winds to surface at approximately 8:00 PM on the evening of May 5, 2009. This same weather forecast was used in the IAP for May 6, 2009

The Sundowner Winds on May 6, 2009 surfaced and increased earlier than expected. This may have been a factor because the weather discussion in the IAP was for the previous day.

## **Recommendations**

The IAP should identify what is to be done for the entire operational period. I.E. "...retreat to safety zone if needed".

Safety zones must be identified and be large enough to allow for the fire to pass without the need for additional protection and be able to accommodate all firefighters and apparatus.

Structures should not be considered safety zones. They are survival zones to only be used as a last resort.

Do not allow the time of year to influence tactical decisions. Base all actions on current and predicted fire behavior.

Providing structure defense during passage of a flaming front should be considered a frontal assault and is one of the eighteen situations that shout watch out.

All engines should be inspected annually to make sure they have an ember screen to prevent the air filter from burning.

## **Site Conditions**

The house at 1165 Tunnel #G, the house is a two story, single family dwelling with a tile roof and stucco siding. The native vegetation was cleared 30 feet on the east with ornamental plants between.

The house at 1165 Tunnel # E, the house is a single story family Spanish style dwelling, with tile roofing, stucco sided. The native vegetation was cleared 30-100 feet around the structure. This residence was not destroyed.

The residence at 1165 Tunnel is a spur ridge that runs east to west. E and G are at the east end of 1165 Tunnel.

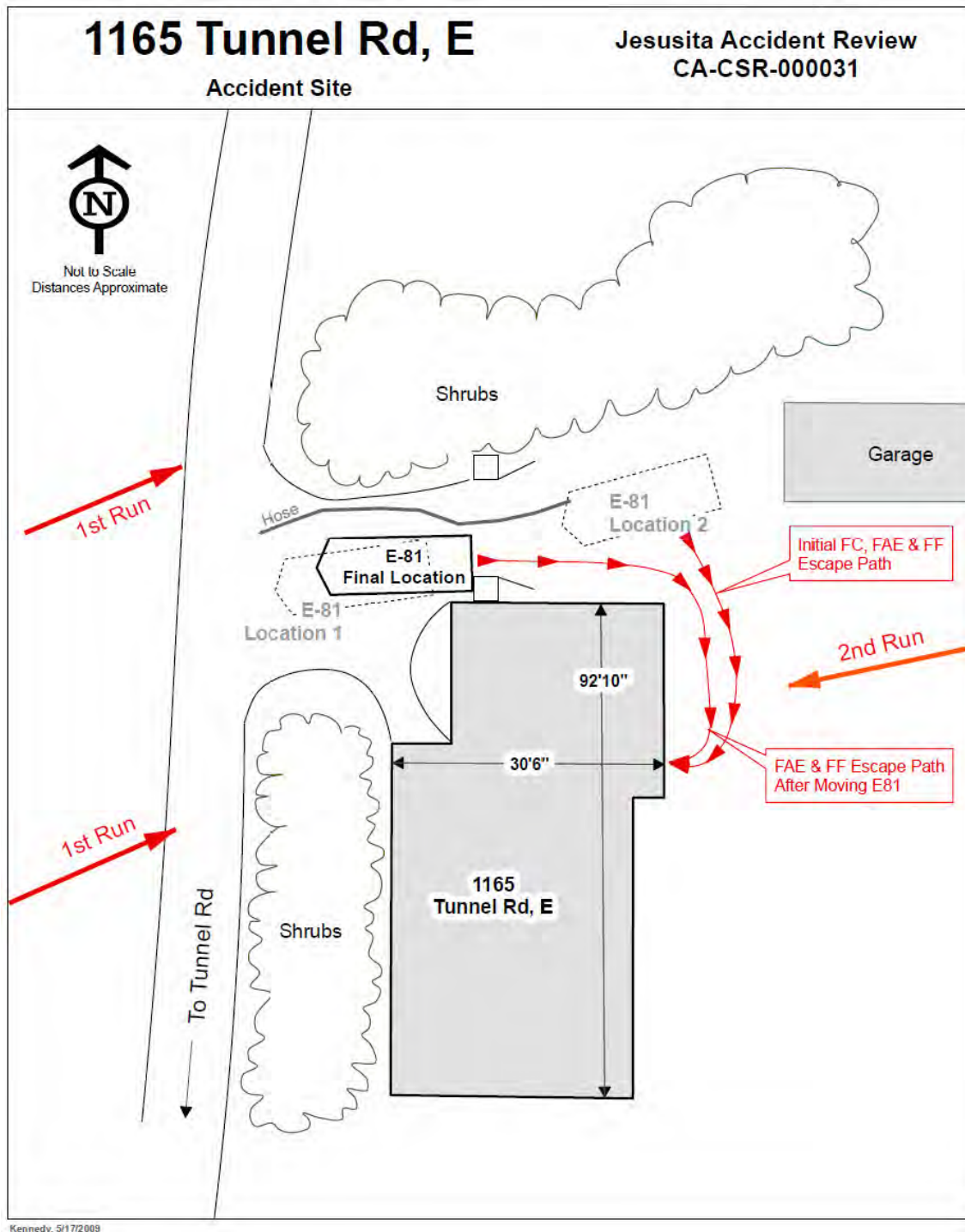
The residence at 1165 Tunnel #G failed its LE-100 inspections in 2008. The inspection program for 2009 had not started. This residence was not destroyed during the fire but the residences at 1255 and 1165 #A Tunnel were destroyed.



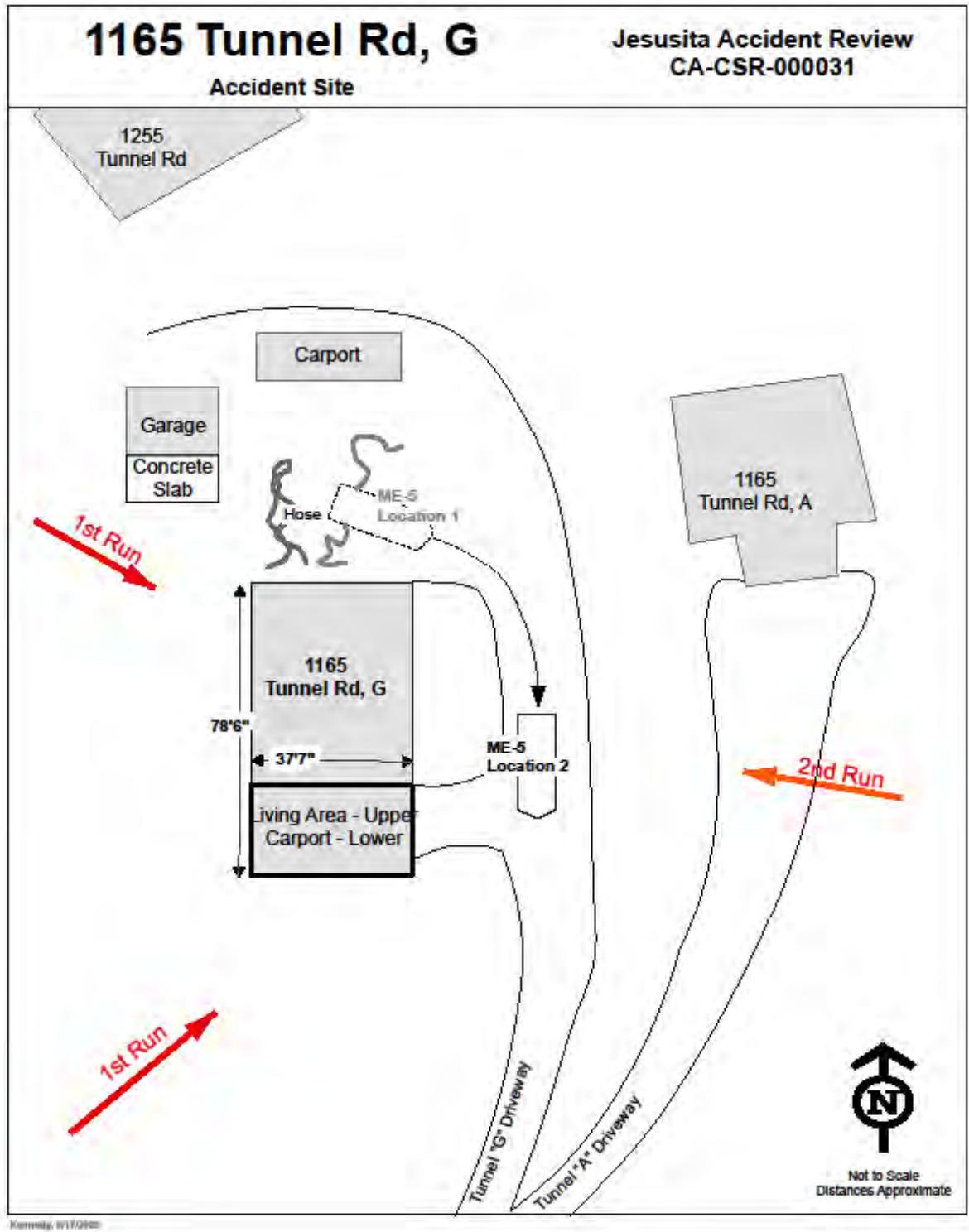
1165 Tunnel #G all outbuildings were destroyed.



Santa Paula City E-81, damage from hitting block column.









Fires path at 1165 Tunnel # E & #G

The fire came from the northwest which would be from left to right on this photo.



## OVERVIEW OF THE PALOMINO ACCIDENT

### 1125 Palomino Road

#### **Equipment and Personnel:**

##### **Los Angeles County Fire Department (LAC)**

LAC Engine 70 (E-70) is a 2007 KME Type I Fire Engine. E-70 was staffed by a Captain, a Fire Apparatus Engineer, and two Firefighters

On May 6, 2009, Los Angeles Fire Department (LFD) ST 1002A was assigned to protect structures on Palomino Road. After receiving the morning briefing and instructions from LFD STEN-1002A, the strike team arrived on Palomino Road at approximately 10:00 AM.

LFD STEN-1002A scouted the area, developed a plan and began to prepare the homes for the fire front. LFD E-98 was positioned facing the direction of egress along Palomino Road directly in front of 1121 Palomino Road. Firefighters deployed two hose lines. One line was identified to protect the home at 1125 Palomino Road and the other line would be used to protect the structure at 1121 Palomino Road. Firefighters removed combustible items away from the structures and established a water source from a supply line pumped from another engine hooked to a hydrant located approximately 300 feet down the road.

LAC ST-1240A was off shift from the previous night and called back to duty from the Incident Base when additional resources were requested. LAC ST-1240A was then assigned to Tunnel Structure Group and arrived at Palomino Road at approximately 3:25 PM. After receiving instructions from LAC STEN -1240A, LAC E-125 and LAC E-70 drove up the lower spur of Palomino Road to protect structures. They were unaware of other engines located on Palomino Road.

Both LAC E-125 and LAC E-70 drove up lower Palomino Road and observed spot fires in the drainage below as they drove around the bend. LAC E-125 went to the end of Palomino Road and backed into the driveway of 1125 Palomino Road, LAC E-70 drove past LAC E-125 and stopped to allow LAC E-125 to clear the driveway. LAC E-125 pulled out of the driveway and proceeded back down Palomino Road.

LAC E-70 backed into the driveway at 1125 Palomino Road in an attempt to turn around. The fire activity increased and LAC E-70 was unable to make the turn and stopped. Firefighters attempted to deploy hose lines to protect their engine. LFD FC-98 observed LAC E-70's position getting hit by the fire front. LFD E-98 and his two firefighters placed E-98's second hose line into operation to protect LAC E-70. Conditions deteriorated, and LFD FC-98 gave instructions for everyone to take refuge in the structure located at 1125 Palomino Road. LAC

FAC-98 remained at the engine while the remainder of the crew sought refuge. The crew from LAC E-70, along with two firefighters from LFD E-98, took refuge in the garage. LFD FC-98 took shelter in the main part of the structure. LFD FC-98 directed the crews to move from the garage to his location farther into the house

LAC FC-70 and LFD FC-98 contacted their respective STEN's by radio as to having had to shelter in the structure. A few minutes later LAC STEN-1240A radioed LAC FC-70 that he was outside the building and it was safe to come out. The crew from LFD E-98 went back to their engine and continued fighting fire. The crew from LAC E-70 returned to the engine and found it had stopped running. The engine was re-started driven to base camp, and was placed out of service in Ground Support.

LAC FAC-70 suffered heat exhaustion, was transported to the hospital via ambulance, treated and released. LAC E-70 received moderate damage. The structure at 1125 Palomino Road was destroyed.

### ***INJURIES:***

- Engine 70 Fire Apparatus Engineer (FAE-70)
  - Heat exhaustion

### ***DAMAGE:***

LAC E-70 had moderate fire damage to the complete front side of the vehicle, including cracks to both front windshields and the cab mounted light bar destroyed. Left side tires were damaged. The motor had stalled on the incident, and the crew discovered the air cleaner had burned.

### **PALOMINO FINDINGS**

#### **Personnel**

The area was scouted by LFD STEN-1002A, structures deemed defensible and a conscious decision was made by the strike team leader and engine company officers to stay and defend structures even with poor escape routes and safety zones.

LAC Strike team 1240A was deployed from base camp while off shift and did not have the benefit of a formal briefing and was unfamiliar with the area.

LAC E-125, 70, and 99 arrived on Palomino road as spot fires occurred in the area of Palomino Road.

LAC E-70 was caught by the fire front, and not able to turn the engine around and egress to a safe location. This forced the crew of LFD E-98 to assist them, and take shelter in the structure at 1125 Palomino.

The extreme fire behavior caused LAC E-70 operator to flee into the structure with partial PPE (no safety helmet, gloves, or web gear, “fire shelter”).

LAC E-70 sustained significant surface damage to the front end.

LAC E-70 had just arrived in the Palomino area when the fire front hit.

### **Equipment**

LAC E-70 was equipped with an ember screen on the motor air intake. During the firefight, a burning ember went into the front air intake, burning the air filter which caused the motor to stall.

### **Access**

Palomino Road is a narrow, steep one lane, dead-end road, without turnouts, surrounded by open grassland with scattered heavy brush and wood land.

The 1125 Palomino property is accessed from a private, single lane, paved road with an average width of 9 feet. The house is located mid slope at the end of a paved road; however a section of dirt road extends an additional 30 feet past the structure.

### **Management**

LAC strike team leader or company officers did not have current copies of the Incident Action Plan due to being off shift when re-assigned.

The Incident Action Plan stated Control Operations for the Mission Structure Group was “Prep and triage structures which could be threatened by advancing fire.”

Even though the structure group supervisor established and communicated a decision point, the arriving engines may not have been aware of the established decision point to “pull out” because they were off shift.

### **CAUSAL FACTOR ANALYSIS**

### **Site Conditions.**

Palomino Road is a one lane, paved, dead-end road, approximately 9 feet wide. Two sections of Palomino Road exist (odd number homes are located on a spur road which forks to the left while even numbers are on the section off Palomino which continues straight. Significant amounts of native vegetation flanked both sides of the road.

### **Human Nature**

Engaging in structure protection with the preconceived idea that “you will not lose structures”, compromises situational awareness.

Several fire personnel from LFD E-98 who were assigned to Palomino Road noted the wind increase. Personnel felt they were prepared for the fire front to bump them.

Engine personnel were not feeling one hundred percent (engine operator assigned to LAC engine 70 reported he may have food poisoning to supervisor; however felt he could work through shift).

The Incident Action Plan stated Control Operations for the Mission Structure Group was to “Prep and triage structures which could be threatened by advancing fire.”

### **Management**

Even though the structure group supervisor established and communicated a decision point, the arriving engines may not have been aware of the established decision point to “pull out” because they were off shift.

The Incident Action Plan for May 6, 2009 stated the control objectives, for the Mission Structure Group, as “Prep and triage structures which could be threatened by advancing fire.”

The IAP should identify what is to be done for the entire operational period. I.E. “...retreat to safety zone if needed”.

The wearing of SCBA's may have contributed to the firefighters using the residence as a refuge and over extending themselves instead of leaving for the safety zone.

## **Contributing Factors**

The spot forecast provided by NOAA and included in the Incident Action Plan called for Gusty Sundowner Winds to surface at approximately 8:00 PM on the evening of May 5, 2009.

The IAP did not identify the winds for May 6, 2009 which was the day of the accident. The Sundowner Winds surfaced and increased earlier then expected.

The structure located at 1121 Palomino was identified as the safety zone. The fire front was described as intense and blowing. The Incident Response Pocket Guide recommends a safety zone with a distance separation of 400' from firefighters to flame.

LAC E-70 was over committed with hose and could not move. The engine was not mobile.

## **Site Conditions**

The house is wood stud construction with stucco exterior approximately twenty years old. It is situated on a south west facing ridgeline. The house is a single story, single family dwelling with open wood eaves. The native vegetation was not cleared and encroached onto the structure. Ornamental plants were scattered in between.

### **LE-100 Notice of defensible space inspection.**

A review of the 2008 LE-100 inspections noted that 1125 Palomino Road failed their clearance inspection.

## **Recommendations**

Crews coming from off shift need to be briefed of the current situation.

Safety zones must be large enough to allow for the fire to pass without the need for additional protection and be able to accommodate all firefighters and apparatus.

Ensure full use of all PPE while on the fire line (at all times).

Provide for enough reflex time for firefighters to reach the safety zone.

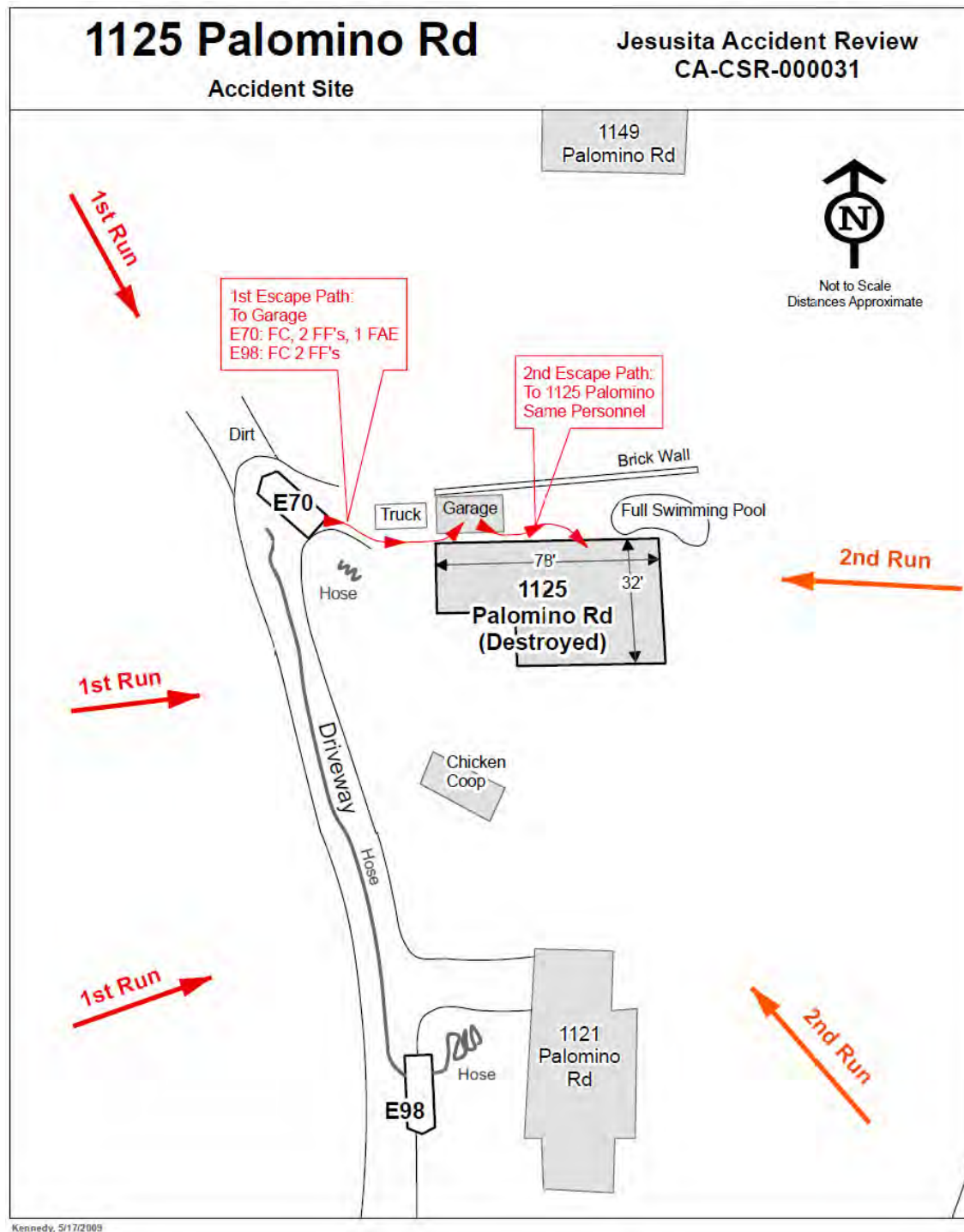
Structures should not be considered safety zones. They are survival zones to only be used as a last resort.

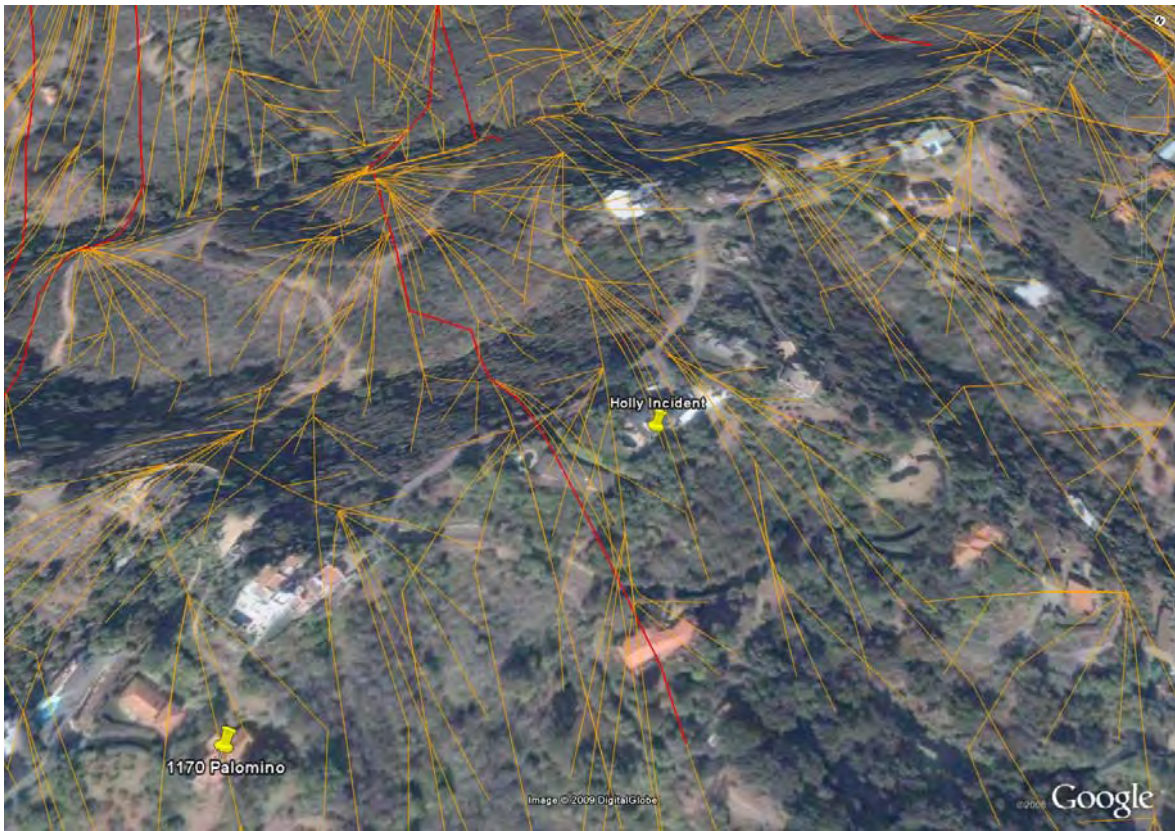
Do not allow the time of year to influence tactical decisions. Base all actions on current, observed, and predicted fire behavior.

Providing structure defense during passage of a flaming front should be considered a frontal assault and is one of the eighteen situations that shout watch out.

When decision points for leaving an area are establish, they must be followed.







Fire path at 1125 Palomino Accident Site., From top to bottom of photo



Driveway at 1125 Palomino





1125 Palomino Accident site where LAC-E-70 took refuge.

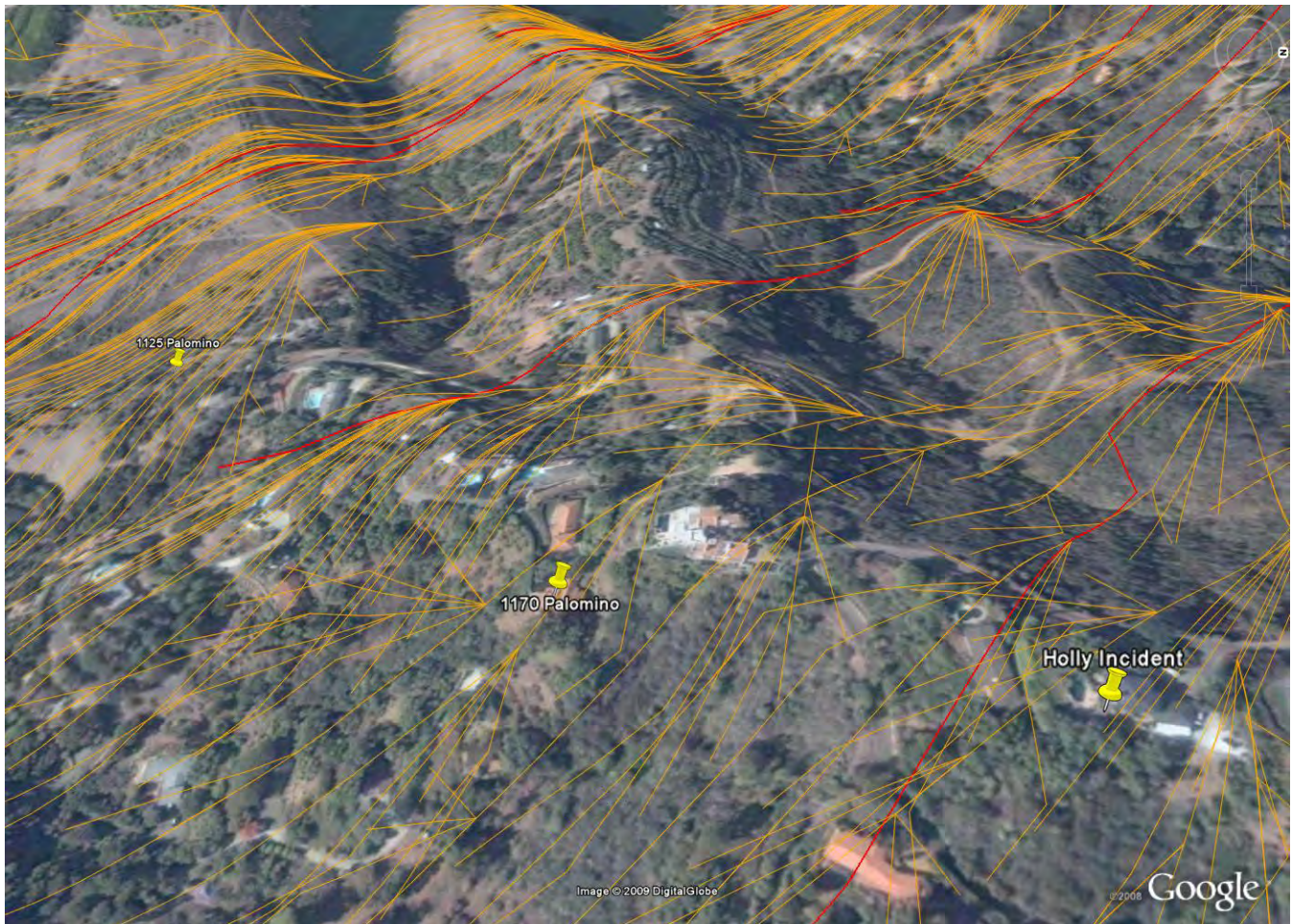


LAC E-70 at the Palomino residence



1125 Palomino Accident Site.

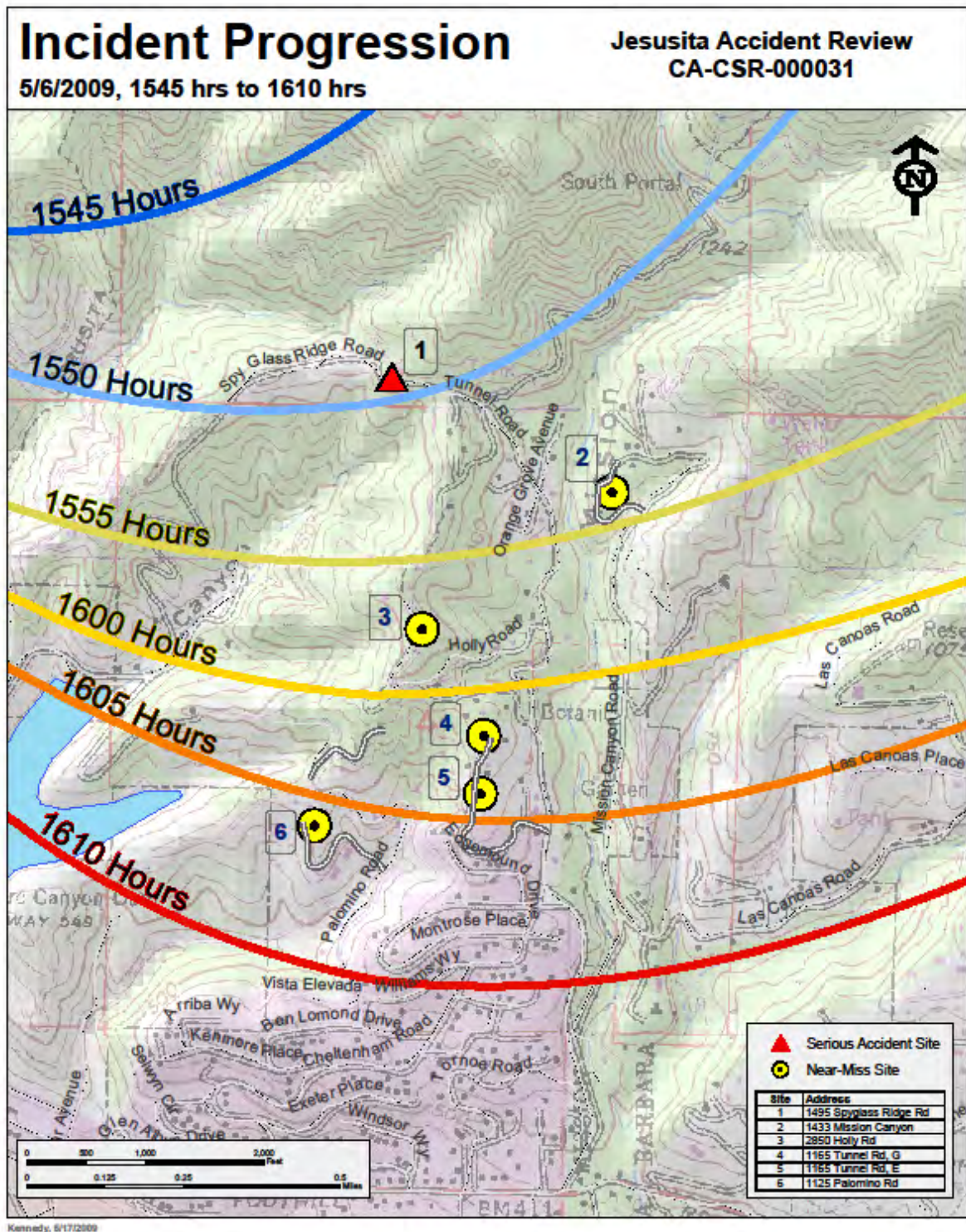




Fire path at 1125 Palomino Road

Fire came from the northwest which is the top right to bottom left in the photo.





## **S-215 Fire Operations in the Wildland/Urban Interface**

### **II. STRUCTURE PROTECTION: LESSONS LEARNED II.**

- A. Tactics employed in structure protection are the same for both wildland and structural firefighting agencies regardless of the type of resources utilized.
- B. Most interface fires occur under high wind conditions, creating rapidly moving fires, extreme fire behavior, long range spotting and multiple fire fronts.
- C. The scattered location of structures in the interface can limit tactics commonly used in wildland firefighting, such as direct attack or burnouts.
- D. Spot fires create multiple fire fronts and firefighters protecting structures are often surrounded by flames, showered by burning embers and are subjected to dense smoke during the battle to save someone's home.
- E. Escape routes and safety zones are easily compromised in structure defense by remaining at the structure beyond what we would consider safe in wildland fire operations.
- F. Mobility is one of the most important tactics employed in structure defense. Engines must be able to quickly move from house to house in the protection effort. Structure engines are larger and less mobile than wildland engines. Consider actions in the deployment of firefighting equipment that will allow for rapid response to the changing fire environment, as well as maintaining the ability to escape to a safety zone.
- G. Wise water use is critical to structural defense. Water may be most effectively used in foam solutions to wet down structural exposures prior to the arrival of the fire front.
- H. Coordination, organization and communications may not be adequate during initial operations.
- I. Resources required may not be available and those on scene may not be able to control the spreading fire. Resources defending structures must be mobile, resourceful, and self-reliant.
- J. The ability to communicate among all agencies responding to interface fires is an absolute must. Regular communication among all resources

is essential.

K. Situational awareness is required due to the numerous factors that can quickly compromise the safety of everyone involved.

### **Incident Response Pocket Guidebook Pg 11**

#### **Wildland-Urban Watch Outs**

- Poor access and narrow one-way roads
- Wooden construction and wood shake roofs
- Powerlines, propane tanks, and HazMat threats
- Inadequate water supply
- Natural fuels 30' or closer to structures
- Structures in chimneys, box canyons, narrow canyons, or on steep slopes (30% or greater)
- Extreme fire behavior
- Strong winds
- Evacuation of public (panic)

### **Incident Action Plan (IAP) written for Day Shift 5-6-09**

#### **Spot Forecast inserted into the IAP for the dayshift of 5-6-09**

- The weather discussion was for the night of 5-5-09 and not for the day of 5-6-09. This may have led to some confusion of what time the winds may surface.
- Northwest to North 28 to 38 MPH with gust near 55 MPH were noted for the day of 5-6-09 with no surface time.

#### **Control Operations for the Structure Branch**

- Prep and Triage structures which could be threatened by advancing fire.



Jesusita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

### Overview

On Tuesday, May 5, 2009, at 1:45 PM, a wildland fire was reported burning in the foothills north of the City of Santa Barbara along the “Jesusita” hiking trail within the Los Padres National Forest – Santa Barbara Ranger District.



*Photo taken before the blow up on Wednesday, May 6, 2009*

On the afternoon of Wednesday, May 6, 2009 several engine companies assigned to structure protection on the Jesusita Fire, north of the City of Santa Barbara experienced extreme fire behavior related to the surfacing of strong down slope (sundowner) winds typical of the area. This sudden increase of fire behavior resulted in the burnover of a Ventura County engine company, causing burns and smoke inhalation to the engine crew members, and major damage to the fire engine.



*Photo of VNC E54 taken after the burn over.*

Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report



*Photo showing structure and fuel conditions taken by VNC E54 prior to burnover.*

Two hose lines were pre-positioned around the main house by VNC E-54. A 100' 1 1/2" hose was placed along the west side of the main house, and a 100' 1 3/4" was placed at the bottom of the driveway near the northwest corner of the main house. Both hose lines were connected to a gated wye for connection to the water supply when needed. FC-54 was advised by STEN-1580A to pre-positioned three (3) Self-Contained Breathing Apparatus (SCBA) inside the main house. No other structural ensemble elements (coat, pants, boots, etc.) were pre-positioned.

At approximately 14:00, VNC E-42, located at the adjacent residence to the West, observed and documented a shift in the wind direction and speed. The winds changed from upslope south-southwest to across the slope (as shown below) from the northwest. Fire activity began to increase on the ridge above their position. The northwest wind continued to increase, and the fire began to move downslope at a faster rate toward Spyglass Ridge Road.





Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

At approximately 3:35 P.M., FC-54 noticed a spot fire above the location of E-54. At the same time, FF-54 pointed out another spot fire near the southeast corner of the main house. A 200' 1 3/4 hose line was then connected from E-54 to the gated wye to charge the pre-positioned hose lines. FC-54 then radioed STEN 1580A and advised that another fire engine was needed. E-30 moved to assist, and backed in next to E-54.

At approximately 4:00 p.m. the fire made extreme advances towards the Spyglass Ridge Road area. Numerous spot fires caused a condition similar to area ignition around 1495 Spyglass Ridge Road. FC-54 told FF-54 to protect the rear of the main structure. After several minutes of firefighting, FC-54 took FF-54 into the structure, entering through the back door on the southwest side to wait for the fire to pass.

While inside the structure, in preparation for their exit out of the house Both FC-54 and FF-54 removed their N95 masks. FF-54 tried to don his SCBA over his department issued web gear (Wolfpack Low Profile Web Gear pictured below). FF-54 was unable to don his SCBA over his web gear and chose to discard his web gear (including his fire shelter) which allowed him to successfully don his SCBA. FF-54 indicated that the hydration system (integrated bladder system in the small of his back) was full and did not allow the donning of the SCBA. FC-54 indicated that he was successful in donning the SCBA because his hydration system was nearly empty.. He was able to don his SCBA over his web gear and fire shelter. No other structural ensemble elements were utilized. FF-54 stated that at the time he discarded his web gear and donned his SCBA, he made the mental switch from the wildland fire environment to the structural fire environment.



As the fire intensity increased, FC-54 radioed STEN-1580A and advised that the FC-54 and FF-54 were in the structure and needed immediate aircraft support. The main



Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

house began to burn, and FC-54 and FF-54 moved to various rooms in the house as the fire progressed through the structure.

FAC-54 had remained at E-54 in the driveway, he used the engine protection line to protect the engine from the advancing fire. FAC-54 was trying to make radio communication with FC-54 and FF-54 but no contact was made. FAC-54 again radioed FC-54 and advised him E-54 was out of water. As the fire advanced towards the location of E-30 and E-54, E-30 dropped their hoselines, donned their SCBA's, and took refuge in the cab. When E-30 ran out of water, FC-30 told FAC-54 to get in the cab of E-30. With concerns for E-54's crew, he reluctantly jumped into the cab of E-30. With FAC-54 now inside the cab with E-30's crew, they attempted to drive down the driveway to safety but were halted by a wall of flames. E-30 waited for a break in the flaming front then drove down the driveway dragging all their hose and nozzles.

With the majority of the main house burning, FC-54 instructed FF-54 to remove the fire shelter belonging to FC-54. FC-54 was going to use it as a heat shield while exiting the structure; FF-54 stated that he did not understand why FC-54 wanted to do with the fire shelter. Before the fire shelter could be fully opened, the sliding glass door shattered, and a rush of heat entered the room. FC-54 and FF-54 made a hurried escape leaving the shelter behind.

As they exited the structure, both instantly felt their skin burning. FF-54 fell to the ground as FC-54 ran up the driveway toward E-54. FF-54 removed his SCBA harness with air bottle, leaving the mask and regulator connected. He began to roll on the ground as he thought he was on fire. FC-54 thought FF-54 was attempting to deploy the fire shelter. FC-54 yelled at FF-54 to continue to the fire engine. FC-54 arrived at the engine and climbed into the back seat on the passenger side, still wearing his SCBA. FC-54 could not locate FF-54, and his low air warning device was sounding on his SCBA.

While in the engine, FC-54 radioed to STEN-1580A and told him that he had returned to the location of E-54. STEN-1580A radioed back and told him that he would come and get him. FF-54 then radioed that he was also back at E-54. STEN-1580A arrived at E-54 and the STEN (T)-1580A placed FF-54 and FC-54 into the rear seat of the vehicle. STEN-1580A drove the injured FC-54 and FF-54 to the residence located at 2845 Spyglass Ridge Road where Paramedic Engine 32 initiated treatment.

Both victims were assessed by the Paramedic. A medivac helicopter was requested due to their extensive burn injuries, but it could not make access due to the conditions. Branch I arrived, and was preparing to transport FF-54 along with the Paramedic when a paramedic ambulance escorted by a law enforcement officer arrived. The paramedic ambulance with the injured FC-54 and FF-54, assisted by a FF-Paramedic from ME-32, transported both patients to Cottage Hospital for evaluation. They were subsequently flown to Grossman Burn Center. STEN (T)-1580A was transported by Branch I to Santa

Jesusita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

Barbara County Fire Station #15 for smoke inhalation injuries. A paramedic ambulance transported STEN (T)-1580A to Cottage Hospital for initial evaluation. STEN(T)-1580A was subsequently flown to Grossman Burn Center. FAE-54 sought treatment for smoke inhalation on May 9, 2009. All structures at 1495 Spyglass Ridge Road were destroyed.

### Personal Protective Equipment Analysis

This equipment report is based on both inspection of equipment and interviews of Engine 54 personnel (one Captain and one firefighter) and the Strike Team Leader (trainee) who were entrapped by the Jesusita fire on May 6, 2009 at 1495 Spyglass Ridge Road.

Note: Human skin begins to burn when the temperature of the skin reaches 131 degrees F. The Society of Fire Protection Engineers Handbook indicates that exposure of bare skin to any type of heating greater than 0.23 Btu/ft<sup>2</sup>-s (2.5kw/m<sup>2</sup>) for a long period will result in burn injury. As a point of comparison, the maximum energy that a person could receive by exposure to the sun is less than 0.09 Btu/ft<sup>2</sup>-s (1kw/m<sup>2</sup>). Exposure of unprotected skin to heating levels greater than 4.5 Btu/ft<sup>2</sup>-s (50kw/m<sup>2</sup>) will result in severe burns in less than 15 seconds.

### INJURIES:

VNC Strike Team Leader-Trainee (STEN-T) Fire Captain:

- Smoke inhalation

VNC Engine 54 Fire Captain (FC-54):

- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to both ears, sideburn areas, and forehead.
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to both arms, from the wrist to just above the elbow.
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to the back of right hand
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to left calf
- FC-54 was single layered in the back of legs between the sock line on his calves and thigh to his cotton gym shorts. FC-54 was also wearing a short sleeve t-shirt and thus had only a single layer of clothing between the wrist and the area just above the elbow. FC-54 sustained burns primarily to the arms where he was single layered.

VNC Engine 54 Fire Apparatus Engineer (FAE-54)

- Smoke inhalation

VNC Engine 54 Firefighter (FF-54)

- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to forehead
- 1<sup>st</sup> and 2<sup>nd</sup> degree burns to left side of neck

Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns left ear
- 3 ½ inch laceration to right side of neck below jaw
- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns to both shoulders and upper back
- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> degree burns to triceps area of both arms
- 2<sup>nd</sup> and 3<sup>rd</sup> degree burns to palm of right hand
  - Includes palm side of all fingers
- FF-54 was double layered in all areas except in the arm area between the end of the short-sleeved t-shirt - just above the elbow, and the wrist. FF-54 sustained burns to the arms where he was single layered as well as to areas of his body (upper back and shoulders) that were protected by double layers.

**Clothing and Line Gear** – The clothing and web gear showed some signs of heat, as described below.

Note: Dye sublimation occurs when heat “cooks” the dye from the material and leaves a gray or tan color in the yellow aramid material. This occurs when the material reaches 450 degrees F. Generally, asphalt starts to melt when it reaches 250 to 300 degrees F.

Contents:

**Bin 1 – Clothing FF-54:**

Items: Flame-resistant (FR) pants (double layer on front of legs from upper thigh to shin) and shirt (single layer sleeves), FR station pants, cotton t-shirt and undershorts, structure hard hat with wildland shroud (single layer), wildland gloves, and structure SCBA.

- Pants:
  - Area of dye sublimation on left cargo pocket
  - Left hip pocket has dye sublimation and asphalt adhered to cloth
  - Melted asphalt adhered to pants while the firefighter was rolling on the ground
- Shirt:
  - Area of dye sublimation and melted asphalt adhered to the shirt on the upper left side of back and left arm.
  - Smaller area of dye sublimation on the right side of the back and right arm is present.
  - Inside of lower back has melted asphalt adhered indicating bottom of shirt was crumpled up leaving the cotton undershirt exposed.
  - The lower back of cotton undershirt also has melted asphalt adhered to it.
- Helmet and Shroud:
  - The helmet shows discoloration to the outer shell mostly on the left side.

Jesusita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

- Shroud shows dye sublimation mostly on the left side. Lines of dye sublimation shows that the shroud was crumpled during heat exposure most likely due to SCBA mask.





Jesusita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

**Bin 2 – FC-54**

Items: FR pants (double layer on front of legs from upper thigh to shin) and shirt (single layer sleeves), cotton t-shirt, gym shorts, socks and undershorts, wildland hard hat with goggles, wildland gloves, fireline gear harness and structure SCBA. The wildland shroud was used but it was not recovered.

- Shirt:
  - Dye sublimation on both sleeve cuffs,
  - Dye sublimation on both shoulder areas
  - Dye sublimation on upper right arm and elbow area.
- Pants: No significant signs of heat.



**Bin 3 – Strike Team Leader (trainee):**

Items: FR pants and shirt, cotton long sleeve t-shirt, cotton undershorts, structure hard hat with wildland shroud, and wildland gloves.

- Shroud: Shows an area of dye sublimation on the right side.
- Pants and shirt: show no significant signs of heat.



**Fire Shelters:**

Two fire shelters were found inside the house. One of the shelters was accordion folded in the same shape in which it was packaged. The second fire shelter that was next to the "escape" sliding glass door was slightly unfolded. Much of the aluminum foil of the shelter had melted away. Much of the fiberglass and silica cloth in the shelter was brittle. The conditions of the fire shelters indicate exposure to an environment that would be expected inside a burning structure – long duration of very high temperatures.

Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

**Wolfpack Gear:**

The line gear worn by FC-54, showed areas of melted nylon cloth, buckles, webbing and hook and loop fastener. Most melting occurred on the left side of the gear. The amount of melted material shows that the high temperature and duration of the exposure was enough to raise the temperature of the nylon to over 450 degrees F. FC-54 removed his gear and SCBA when he was inside the rear seat compartment of E-54. When the gear was recovered from E-54 it was discovered that part of the melted material had adhered to a metal component of the engine cab



**SCBA:**

- The Ventura County Fire Department does not have Standard Operating Procedures (SOP's) or any training policy or procedures that cover the use of an SCBA in the wildland environment.
  - Both FF-54 and FC- 54 had never participated in informal training or discussion on the use of SCBA's in the wildland environment.
  - The use of SCBA's in this burn over was an impromptu use of the tool without formal guidelines.
- While seeking refuge inside the house, FC-54 and FF-54 donned the SCBAs that had been previously placed there.
- When FC-54 and FF-54 exited the structure they reported running through intermittent flames for about 2 to 3 seconds.
  - It is estimated the temperature of yellow flames is 1,500 degrees F.
- FC-54 ran out of air in his SCBA while still entrapped within E-54. While taking refuge next to E-54; FF-54 was able to connect another full bottle of air to the original bottle that was close to being empty.
  - Breathing air that is hotter than 300 degree F can cause fatal damage to a firefighter's airway. Both FC-54 and FF-54 felt that using the SCBA saved their lives.



Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

**Discussion:**

- VNC E-54 personnel were utilizing department issued PPE.
- Wildland PPE is in no way capable of offering protection sufficient to survive a burnover or burning structure. Escape routes and safety zone must be the priority over “hunkering down” while using an SCBA.
- Both Fire Captain (FC) 54 and Firefighter (FF) 54 utilized a department issued particle mask style N95. The N95 masks were worn under the helmet shroud until the moment of entrapment.
  - N95 particle masks are not part of the VNC Wildland PPE Ensemble nor are there Standard Operating Procedures / Policy (SOP) for the use of the N95 particle mask as part of the Wildland PPE Ensemble.
  - VNC provides N95 masks for responses in a “dust” environment for which the N95 particle masks are designed.
  - N95 masks may filter larger particles like smoke, but do not filter carbon monoxide (CO). In reducing the discomfort caused by smoke, it may increase the firefighter’s duration of exposure to CO, which can result in headache, dizziness, mental confusion and even death.
- California Code of Regulations (CCR), Title 8 requires employers to identify hazards employees face in the workplace. Additionally, CCR Title 8 requires employers to provide PPE commensurate with the level of exposure and train employees to the capabilities and limitations of the PPE provided.
- Ventura County Fire Department (VNC) is in the process of conducting an assessment to determine the most appropriate protection level of the wildland ensemble. Specifically, VNC is considering the risk associated with internal heat stress injuries compared to risk associated with burn injuries. Currently, some VNC firefighters are utilizing single layered wildland ensembles that provide a reduced risk of heat stress injuries while some are utilizing a double layered ensemble which provides a greater degree of thermal protection and reduced risk for burn injury.
- FC-54 stated that although he supports the concept of single layering to reduce internal heat related injuries he also supports the concept of providing a double layered sleeve to better protect the arms.
- Both FF-54 and FC-54 appeared to have received some protection from burns where their skin was covered by double layers of cloth. While this event may seem to recommend the use of double layers, it should also be recognized that heat stress injuries are more likely when using double layers. Both factors should be considered when decisions are made regarding PPE requirements for wildland fire fighting.

Jesuita Fire Burnover  
CA-LPF-001479 / CA-CSR-000031  
Spyglass Ridge Road Burnover  
Personal Protective Equipment (PPE) Report

- SCBA bottles usually hold 30-45 minutes of air, this burnover lasted longer. Some entrapments/burnovers can last more than one hour.
- The planned use of an SCBA may lead firefighters to stay in more risky positions longer, which may compromise the ability of firefighters to escape.
- Sheltering within a structure is risky, like fire shelter deployment sites, structures must be evaluated for survivability.
- Having an SCBA in one direction and an escape route in another may cause confusion and delay in firefighters making a choice between escape and staying in place.
- If it is determined that the use of an SCBA is warranted in a wildland fire environment –
  - Should the rest of the structural ensemble be used as well?
  - Further evaluate the level of commitment – is risking my life worth (blank)?

#### Recommendations

1. N95 style particle masks should not be used in the wildland fire environment.
2. Wildland PPE is designed with limited protection capabilities; firefighters must be aware of these capabilities.
3. Firefighters should make escape routes and safety zone a priority over the planned use of an SCBA.
4. Review the policy for inter-mixing wildland and structural PPE components.
5. Firefighters should not abandon their fire shelter in the wildland fire environment.

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Tom Foley  
Deputy Chief  
California Southern Region, CAL FIRE

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Date

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Tony Petrilli  
Fire Equipment Specialist

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Date

## Jesusita-Spyglass Accident Web Gear Analysis

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May 29, 2009

Tom Foley, Deputy Chief Operations, CAL FIRE  
Kevin Gains, Battalion Chief, CAL FIRE

Re: Web Gear / Line Pack Heat Exposure Analysis

Thank you for taking the time to meet with me at the Courtyard Oxnard Ventura Hotel on Monday May 18, 2009. Subsequently, I also met with Ventura County Fire Battalion Chief Dave Chovanec at the Ventura County Fire Fleet Maintenance facility on Thursday May 21, 2009. The scope of these meetings were an attempt to ascertain an understanding of the potential temperatures that the Wolfpack Gear Low Profile Hydration Pack and Accessory Bags (Pack System) worn by [REDACTED] were exposed to during the Jesusita-Spyglass burn over accident. As you know, the second Wolfpack Gear pack system worn by [REDACTED] was discarded during the incident and was destroyed in the fire. Thus only one pack system was inspected.

It is important to understand that this inspection is a quick visual inspection of the system and some key components of [REDACTED] personal protective equipment. Any assumptions or conclusions made in this report are solely based on the comparison of the condition of [REDACTED] pack system against similar conditions found in previous testing performed by Wolfpack Gear. General assumptions can be made based on the condition of the pack system and the contents of the bags that allow for good estimations of exposure temperatures and durations. Actual exposure temperatures may never be known.

Mike Oberndorfer, President  
Wolfpack Gear, Inc.

### Observations

The Wolfpack Gear hydration pack and accessory bags worn by [REDACTED] during the Jesusita-Spyglass burn over accident and the contents of the accessory bags were removed from an evidence bag that was stored in BC Gaines' vehicle. General assumptions are that the pack system and contents are presented as they were found within Engine 54 and that nothing had been removed from the accessory pockets or that the running end of the flagging tape had not been tampered with. The Self Contained Breathing Apparatus (SCBA) worn over the top of the pack system and the wildland pant and jacket were briefly inspected to confirm placement of components and confirmation of similar damage to those items.

The pack system is presented as complete with no missing parts and appears to have significant damage to the left side outer fabric of the Low Profile hydration pocket. The damage in this area affects the 1050 Ballistic Nylon outer fabric, the YKK nylon zipper and the PVC Wolfpack Gear Label. The damage does not extend to the exposed foam inner panel, webbing or seam binding. Minor damage is noted to the hook and loop of both the glove keeper and the fire shelter case. Again the damage does not extend beyond the hook and loop. Each component of the pack system is listed separately below as damage appears to be significantly different to each item.

## Jesusita-Spyglass Accident Web Gear Analysis

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The contents of the bag are undamaged.



**Fire Shelter Case from a Detachable Day pack**  
**SKU: DDP-HR-2400-BK**  
**Lot #: Undetermined**

The Fire Shelter Case is a component of an NFPA 1977, 2005 edition compliant Detachable Day Pack. The Fire Shelter Case is designed to be mounted on the rear center of the waist belt and can be used independent of the main compartment of the Detachable Day Pack. The fire shelter case was mounted on the rear center of the waist belt and found with the fire shelter and the plastic liner removed. The contents of the bag were not present or inspected.



The shelter case is intact with the cover flap partially open. Minor damage is noted to the loop material at the opening.



A clear line is visible indicating the position of the cover flap at the time of exposure. The damage to the loop material that was exposed is consistent with exposure to temperatures of 450 degrees and above for short periods of time. The bag did not ignite or drip.



## Jesusita-Spyglass Accident Web Gear Analysis

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The damage sustained to the fabric on the left side of the hydration pocket is unique and inconsistent in a couple of ways. First, the damage appears to be very severe to the 1050 Denier Ballistic Nylon which has a higher mass and melting temperature than the foam panel behind it. Similarly, the seam binding in close proximity does not appear to be affected to the degree that the fabric is. Secondly, similar assemblies have failed during testing and the result is usually a transfer of melted plastic to the protective clothing and any equipment that may have come into contact with it.



Mannequin test results at the University of Alberta.

Note that the fabric has melted onto the protective garment and the damage to the underlying foam panel.

Conversely, [REDACTED] PPE shows no sign of material transfer on either his Nomex jacket or the SCBA.



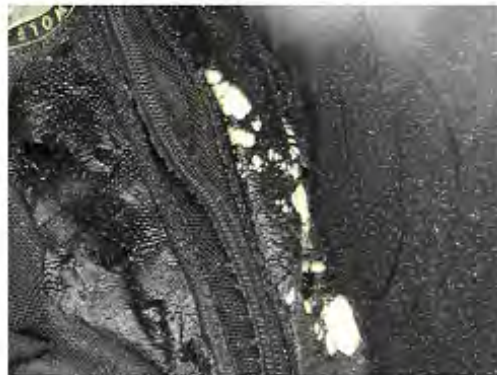
Nomex Jacket and pack system worn by [REDACTED]

### Jesusita-Spyglass Accident Web Gear Analysis

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During the inspection of photographs taken at the accident site [REDACTED] pack system is seen in the right rear passenger compartment of E54 with the SCBA worn during the event. These items were discarded by [REDACTED] after seeking refuge in E54. The pack system is situated between the SCBA and the rear of the engine cover. Upon closer inspection the pack system at the point of damage to the hydration pocket is in contact with the engine cover and a melting to the cover.



An inspection of the engine cover revealed that small pieces of the melted fabric remained on the engine cover after the removal of the pack system.



This is consistent with the earlier observation that creases, wrinkling and matting of the fabric indicate that the material was in contact with a relatively flat surface while at or very close to its melting temperature. The lack of melted material transfer to either the Nomex jacket or SCBA indicates that the melting most likely did not occur until the pack was removed and discarded in E54.



### Jesusita-Spyglass Accident Web Gear Analysis

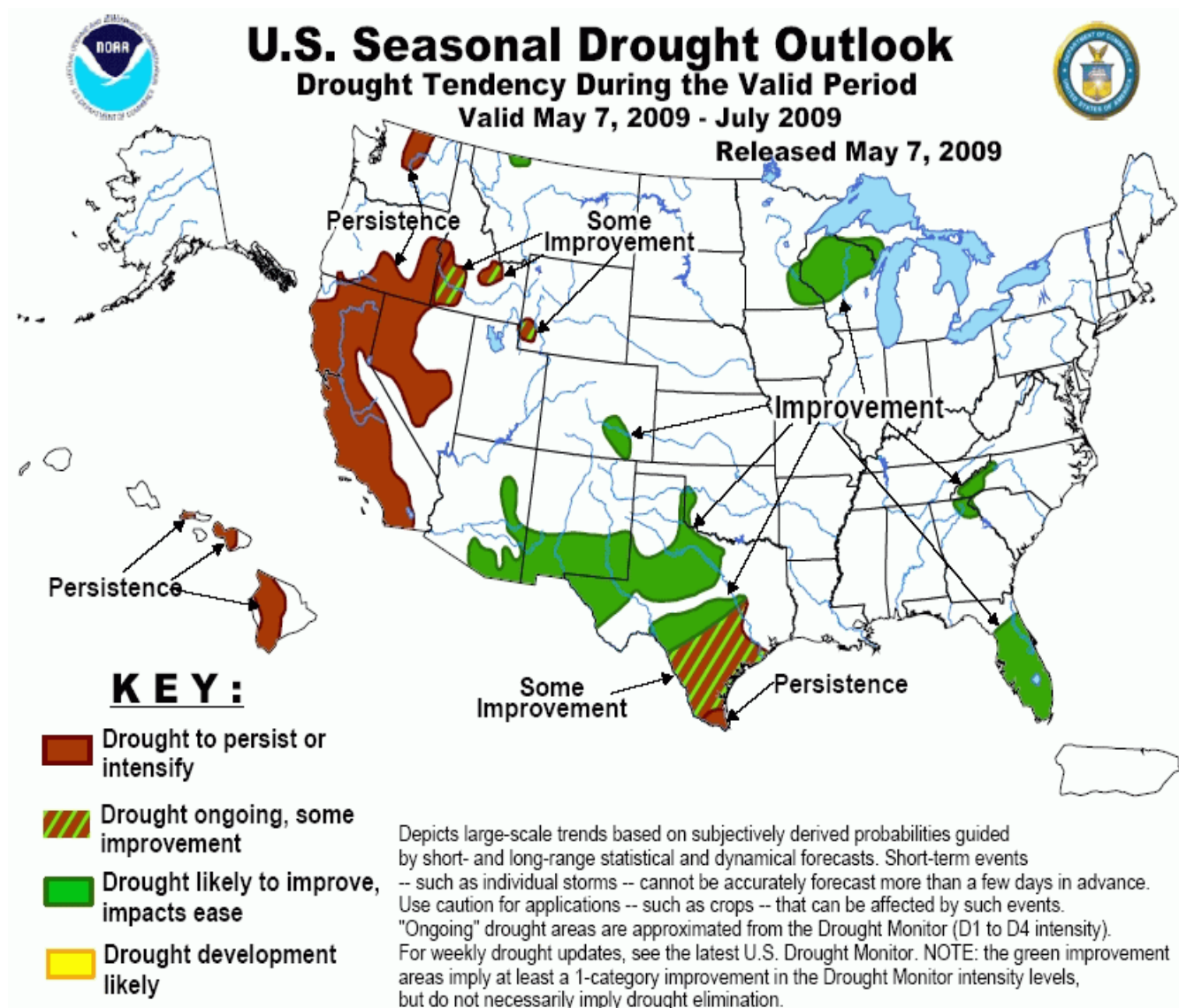
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In summary, the damage observed to the Wolfpack Gear Hydration Pack System is consistent with exposures to temperatures of 450 to 500 degrees that could have been sustained for abnormally long periods of time due to the respiratory protection afforded by the use of the SCBA. Damage to the plastic buckle and the curling of webbings are usually seen during oven tests where temperatures of 475 to 500 degrees are sustained for periods of time up to 3-5 minutes. The visible damage to the hydration pocket is consistent with the outer fabric on the left side being exposed to radiant heat temperatures of 475 to 500 degrees for an extended period of time. It is also plausible that the left side of the pack system was exposed to radiant heat in the range of 800 plus degrees and possibly direct flame contact for brief periods of time, probably less than 2 seconds. It would be my conclusion that the material was very close to failing but did not fail during [REDACTED] run to E54. At the point the pack system and SCBA were discarded, the left side of the pack system came to rest against the engine cover thus insulating that portion of the bag and allowing the bag to retain its heat. This event in combination with the preheating of the fabric to temperatures very near or at its melting temperature caused the fabric to degrade by shrinking, deforming and sticking to objects it came into contact with. This would also explain why the interior foam panel did not sustain damage and its appearance that it was protected during the event.

Wolfpack Gear, Inc. as part of its continuing commitment to pack safety will perform more detailed testing and analysis in the future based on the conditions reported during this incident that may or may not alter conclusions found in this report. If we can be of any other assistance please feel free to contact:

Mike Oberndorfer, President  
Wolfpack Gear, Inc.  
Desk: 805.226.5441  
Cell: 805.423.2691  
Email: Mike@WolfpackGear.com



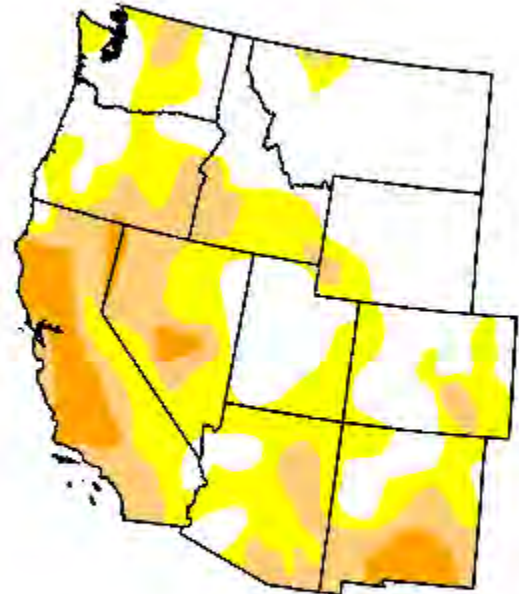
# U.S. Drought Monitor West

May 12, 2009  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.3	56.7	26.2	7.3	0.0	0.0
Last Week (05/05/2009 map)	38.8	61.2	24.6	6.9	0.0	0.0
3 Months Ago (02/17/2009 map)	37.6	62.4	24.4	10.1	2.2	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	0.0
Start of Water Year (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (05/13/2008 map)	33.4	66.6	35.8	6.2	0.0	0.0

## Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



The Drought Monitor focuses on broad-scale conditions.  
Local conditions may vary. See accompanying text summary  
for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, May 14, 2009

Author: D. Miskus/M. Rosencrans/A. Artusa, CPC/NOAA

## **Training Report**

A Training Representative was part of the initial Serious Accident Review Team order on May 6, 2009. The representative was to request and review the training and qualifications of personnel from each of the department/agencies involved in the event. The training representative was also utilized as an Operations Subject Matter Expert during the initial review and information gathering.

Records were requested from ten different departments asking for the following information for portions of the Command and General staff, Strike Team Leaders, Company Officers / Engine Captains, and others directly involved.

- What are the individuals current Wildland Qualifications?
- When was this qualification attained?
- How many assignments has the individual been on as such?
- List of wildland courses attained and the year completed?
- Who was the sponsor of the course? Local, Federal/NWCG, Agency, Academy?
- Does the individual or agency have any specific structure protection courses - S-215, I-Zone drills, etc
- Does the individual have any CICCIS Certifications?
- Any other information that would be helpful to the team.

The response to this request was met by a wide variety of cooperation and or concern. The intent was not for punitive purposes, but as a learning tool and to develop some lessons learned and information for the final report. Some departments replied very quickly with complete records of all requested personnel. Some departments provided some of the requested information but either did not have it all, or did not provide it. Others had concerns and involvement from union representatives with the use of the Firefighter Bill of Rights which delayed the receipt of the records. One department had to have the City Attorney review the requested information before it was submitted.

The individual training records were received and information was placed in tables for easier review. Attached at the end of the Training Report (Exhibit-1) is an acronym list for position qualifications, training courses, and course numbers. The attached tables (Listed by department) contain the information gathered from the records. It is understood that other employee training may have been completed, and qualifications achieved, but documentation was not provided. The tables reflect the completed specific position, fire behavior and other relevant training and the agency certified Incident qualifications applicable to the incident assignment.

### **Findings – Training & Qualifications Documentation**

- Most employees had completed the required training for the position they were functioning in.
- Most, but not all employees were at least agency certified for the position they were functioning in and some of the local government agencies had CICCIS certification in addition.
- Not all employees from all departments have completed, or have not filed, the required NIMS training IS-700 and or IS-800.
- Most employees have good training records and have them properly filed.
- Some departments are using the IQS system while others are still on an individual agency data base. If departments were to utilize similar data bases, information and records would be easily reviewed and transferable between departments.
- Some Departments don't have documentation showing how and or when the grandfathering / historical recognition process for individual qualifications was accomplished.
- Some departments are not utilizing the CICCIS or a peer review process. Others use the process, but do not have the documentation on file.
- Good documentation of fire experience in addition to training and qualifications is lacking with some departments.
- Some departments are not issuing any type of Incident qualifications cards for out of area responses.
- Department Training Chiefs were able to use the request for records as a reminder to their employees of the importance of good record keeping and proper filing of the records.

### **Findings – Training Curriculum & References**

#### **The Incident Response Pocket Guide (IRPG)**

The IRPG is a standard reference for all firefighters in the wildland fire environment. The references, guidelines and Watch Outs that address fire within the Wildland-Urban Interface are a great tool to assist both firefighters and fire managers in decision making. These are excellent tools that can be utilized on every incident.

In addition to the Standard Firefighting Orders and the Watch Out Situations (10 & 18) and Lookouts, Communications, Escape Routes, and Safety Zones (LCES) The Incident Response Pocket Guide contains the following:

- Wildland-Urban Watch Outs – Exhibit F-1
- Structure Protection Guidelines – Exhibit F-2
- Structure Assessment Checklist – Exhibit F-3



## **S-215 Curriculum Fire Operations in the Wildland/Urban Interface**

S-215 is required training for single resource bosses (tractor/plow, dozer, engine, or crew) who are seeking certification as incident commander Type 4 (ICT4) and/or strike team leader (STLP, STDZ, STEN, STCR) as identified in the National Wildfire Coordinating Group (NWCG), Wildland and Prescribed Fire Qualification System Guide (PMS 310-1). S-215 is a 28 hour course designed to meet the training needs for incident commanders (Type 4), strike team leaders, and company officers confronting wildland fire that threatens life, property and improvements in the wildland/urban interface.

*S-215 is the national standard for Fire Operations in the Wildland/Urban Interface and has excellent guidance and information. A section in Chapter 5, Lesson A – Initial Operations and Site Preparation has a document called Structure Protection: Lessons Learned (Exhibit S-215 – 1). This document alone has valuable information that could be reviewed annually for units and or individuals with a potential to be assigned in the interface.*

### **Findings – Agency Standards for Wildland Urban Interface**

Agency policy regarding urban interface incidents, equipment, tactics and strategy differ greatly. The SART followed up with a request for agency policy regarding WUI fires and minimum hose size for deployment. Either some departments do not have a policy or did not reply with the request. Enclosed is the policy or direction from the agencies that replied. The questions sent to the agencies are as follows:

What is, or do you have a policy or SOP for:

- Standard or minimum diameter hose line for wildland fires?
- Standard or minimum diameter hose line for structural fires?
- Standard or minimum diameter hose line for WUI/Structure Protection fires
- Minimum or standard type nozzle or minimum flow for each of these type fires
- Minimum or standard diameter hose, nozzle type or minimum flow for engine protection?

### **CAL FIRE**

Fire Operations Handbook 7000, Section 7013.7.1, Placement of Apparatus, Hose Deployment, and Personnel Placement- (Exhibit CALFIRE-1)

### **USFS**

- Wildland Urban Interface Operating Principles- November 29, 2007, Exhibit USFS-1
- Wildland Fire Suppression Policy for Structure Protection- May 5, 2009, Exhibit USFS-2

- Forest Service Structure Exposure Protection Principles- April 14, 2009  
Exhibit USFS-3

**Ventura City Fire Department:**

- Typical Structure Protection Procedures, Exhibit VEN-1
- Wildland Interface Pre-Fire, Exhibit VEN-2
- LCES, Exhibit VEN-3

**Santa Barbara City Fire Department:**

- WUI Response, Exhibit STB-1

**Ventura County Fire Department:**

- Operational Procedure, 5200, Watershed Fire Doctrine, Exhibit VNC-1
- County has an annual Strike Team Leader Refresher course for all STEN's that could be mobilized out of the response area.

Position on Jesusita Fire at the time of Incidents	Name Rank	Applicable Qualification for Position on Fire	Applicable Completed Course Work	Qualifications Standard / Missing Qualification or Training
STEN	Ron Leydecker Battalion Chief		S-290 S-330 S-339	PMS 310-1 & CICCS / No Qualifications Provided Missing S-215
STEN(t)	Antoine McKnight Battalion Chief		S-290 S-215 S-330	PMS 310-1 & CICCS / No Qualifications Provided, meets training requirements
STEN's Driver	Keenan Porche Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FC	Robert Baker Captain		Only Agency Specific	PMS 310-1 & CICCS / No

			Training Provided	Qualifications Provided
FAE	Mike Beltran Engineer		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FF	James Rix Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FF	Hani Jejjoni Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FC	James Ullrich Captain		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FF	Jess Beltran Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FAE	Charles Hallman Engineer		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
FF	Michael Maclaren Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCIS / No Qualifications Provided
STEN	Greg Gibson Battalion Chief	STEN*	S-290 S-390 S-330 S-339	PMS 310-1 & CICCIS / Meets qualifications for STEN, Submitted Qualification Card is dated 2005
STEN(t)	Gerry Malais		S-215 S-330	PMS 310-1 & CICCIS / No Qualifications Provided
STEN Assistant	Ronald Spiers		Only Agency	PMS 310-1 &

			Specific Training Provided	CICCS / No Qualifications Provided
FC	Sergio Franco Captain		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FC	Greg Peters Captain		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FAE	Steve Schrobsdorf Engineer		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FF	Matthew Corral Firefighter		S-290	PMS 310-1 & CICCS / No Qualifications Provided
FF	Patrick Mandich Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FC	Scott Quinlan Captain		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FAE	Michael Wetzel Engineer		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FF	Richard Diede Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided
FF	Gordon Wilson Firefighter		Only Agency Specific Training Provided	PMS 310-1 & CICCS / No Qualifications Provided

\*Indicates CICCS Certification



## **Safety Concerns Encountered During Review**

1. **LCES CONSIDERATIONS:** Appropriate LCES mitigations must be established based on current and expected fire behavior. Assigned resources should be alert for changing conditions and adjust both tactics and LCES measures to meet new levels of risk.
  - a. **Lookouts:** Lookouts must be dedicated to this task as a singular duty and be thoroughly familiar with the responsibilities of the position.
  - b. **Communications:** All assigned resources must be familiar with the incident's communication plan and have radio capability for the listed frequencies. The com plan on 05/06/2009 was inadequate, lacking a sufficient number of tactical frequencies to match the scope of the incident and the number of resources assigned.
  - c. **Escape Routes:** Escape routes are easily compromised in structure defense by remaining at the structure beyond what would be considered safe in wildland fire operations. Escape routes on this incident were compromised by large numbers of Type I engines on a poor system of steep, narrow, winding roads funneling through a single outlet.
  - d. **Safety Zones:** Adequate safety zones were nearly non-existent in the areas of Mission Canyon, Lauro Canyon, and Spyglass Ridge. In nearly all cases, structures should not be relied on as safety zones. They are "survival zones" and should be used only as a last resort. If no adequate safety zones exist, decision points should be set for leaving the area using a designated escape route.
2. **USE OF BREATHING APPARATUS:** In a number of cases on this incident, crews felt it necessary to don breathing apparatus simply to remain in an area. This is a situation that shouts, "**Get Out!**" When conditions are degraded to this extent, a structure should be considered indefensible and resources move to a safe area. Personnel involved in structure protection must not use breathing apparatus to justify taking greater risks, but rather as a last-resort "survival tool" in case of entrapment.
3. **MOBILITY:** Mobility is one of the most important tactics employed in structure defense. Consider actions in the deployment of firefighting equipment that will allow for rapid response to the changing fire environment as well as maintaining the ability to escape to a safety zone. Avoid having engines anchored to hydrants.

**4. SITUATION AWARENESS:** Maintaining situation awareness is essential due to the numerous factors that can quickly compromise the safety of the resources assigned. Overhead at all levels should remain flexible and be prepared to modify tactics based on changes in the fire environment. Critical information concerning recognized hazards, unexpected weather changes, significant events, etc. needs to be communicated to all resources as well as the Planning Section.

**5. Spot Fires:** Spotting can create multiple fire fronts sometimes surrounding firefighters, engulfing them in an ember environment, and subjecting them to dense smoke which obscures visibility.

**6. Briefings:** All personnel must receive a quality briefing prior to starting their shift. This should include resources pulled from staging areas into active line assignments. Briefings should include pertinent local factors affecting fire behavior.

## **SITE SPECIFIC FIRE BEHAVIOR ANALYSIS**

### **1495 Spyglass Ridge Road**

The Spyglass Ridge Road address was among the first areas to be impacted by the extreme fire behavior event that occurred on the afternoon of May 6th, 2009. According to video analysis, still photography and witness statements, the morning of the 6th was generally benign in regards to fire behavior. However, as the day progressed, the fire began to experience the combined effects of lowering relative humidity, increasing temperature and change in wind direction. At approximately 1430 the north wind effect began to overpower the traditional upslope, upcanyon wind pattern. This wind direction directly aligned the entrenched fire with the topography. By 1530 the fire was producing significant downrange spotting. This spotting component then led to a rapid blowup condition with exceptional convection dynamics; further increasing downrange spotting. Just prior to 1600 this convective energy ran upslope in the aligned drainage directly north of the Spyglass Ridge Road address. Low scorch height patterns and unburned 1 hour fuels in this drainage indicate very high wind speeds as the fire advanced through the property. Personal property, as well as the structure itself, contributed to the fire load and local intensity. By 1610 the fire was now deeply established in the "bowl" topographic feature directly to the south of the property and convective energy was now being funneled perpendicular to the initial impact. By this point, considerable heat energy still remained in the area; but the primary activity had moved on towards the south. It is worth mentioning that this property was closest in proximity to the fire when it changed direction and intensity as well as being topographically aligned with three separate drainages.

### **2850 Holly Road**

The property at Holly Road was affected in rapid succession as the energy released from the chaparral fuel type provided solid lifting dynamics to send firebrands in the downwind direction and directly into the "bowl" feature directly to the west of the address. Due to the high probability of ignition, spot fire quickly became established in this feature. The fire then followed the path of least resistance up through the various drainages; releasing more energy and further propagating fire spread via spotting. Being centrally placed on a ridge running north to south and in the overall direction which the fire progressed; the Holly Road property is topographically aligned to several of the aforementioned "draw" features. Evidence suggests that significant heat coursed through the property. Consequently, spotting occurred into the "draw" towards the east side of the property and additional fire channeled upslope from the opposite direction of the main heat flow. This pinching type fire behavior, commonly reported during the incident as whole, was described as "the fire was everywhere". This process would repeat itself over and over as the event unfolded.

### **1433 Mission Canyon Road**

The home on Mission Canyon Road is generally located in the shadows of Mission Canyon; a large, narrow feature running deep into the front coastal range of Santa Barbara. This topographic placement was instrumental in how the fire spread moved through the area in question. With the weather pattern which was in place during the first week of May, subsidence generated wind followed the same path as the erosion patterns in the canyon. At approximately 1530, the east flank of the fire perimeter from the previous days' burn period became increasingly active and large spot fires were noted outside of retardant lines. The fire was then spread further by strong erratic winds which were observed to blow in opposite directions within a short time span. Within moments, the fire was burning aggressively on the west side of Mission Canyon and soon spotted to the east side of the canyon and directly below the property. Once established in heavy fuels below the property, the fire was aligned with the upslope topography and the cross slope wind component coming adjacent the Spyglass Road location. Needle freeze and heat patterns indicate that fire quickly impacted the property. As seen in other locations, the fire spotted into a small gulley to the east of the property with Model (2) fuels and ran upslope to the home, contradictory to the main fire flow.

### **1165 E, G Tunnel Road**

The homes on Tunnel Road are characterized by the rolling terrain on which they are placed. A central road bisects the ridgeline lengthwise with sloping terrain falling off to the east towards Mission Canyon and westward towards a small box canyon near Palomino Road. During the extreme fire behavior event, the Tunnel Road properties were primarily impacted by a significant spotting dynamic produced by robust energy release from the upwind fuel beds of model (4) chaparral. It appears that numerous fires were ignited in the highly receptive fuel bed composed primarily of annual grasses and considerable ornamental vegetation under a canopy of oak trees; fuel Model (2). It is important to note, that by this time, many homes upwind of the property were becoming well involved with fire, promoting further spotting and radiant heat spread. As reported by witnesses, the fire quickly spread in all directions under the influence of low relative humidity and erratic winds.

### **1170 Palomino Road**

The 1170 Palomino Road property is the last residence on the street and is located along the same spur ridge that translates through the Holly Road address; eventually terminating at the Spyglass Road site. Like many of the sites, this Palomino Road address is topographically aligned with several "bowl" and "chimney" features. The small box canyon to the east is the same canyon which borders the Tunnel Road addresses to the west. This canyon is south facing and possesses brush and annual grasses consistent with a low load Model (4).

During the fire event, this Palomino address was also affected by the significant long range spotting as the fire behavior rapidly accelerated from the north. The south facing fuel bed of 1, 10, and 100 hour fuels quickly ignited and raced through the favorable topography. At some point it is estimated that products of combustion were focused from three separate directions. Several large homes in the immediate vicinity succumbed to the fire and further supplied heat and ember source for continued spread.

### **1125 Palomino Road**

Lowest in elevation amongst the incident sites, 1125 Palomino Road was geographically furthest from the initiation of the extreme fire behavior event of May 6th, 2009. The property is located mid-slope along the eastern edge of a south facing bowl. The fuels in the area were generally classified as annual grasses with intermixed Mustard. This light loaded, but highly receptive fuel bed was directly adjacent to several working orchards of citrus and avocado. Site surveys and witness statements confirm that spotting from upwind ember source was the primary factor in fire initiation and spread. A north facing aspect located to the west of the site address was identified as one of the first locations in the vicinity to receive fire activity. Pushed by winds from the north, this area quickly spread fire over the top and into the bowl where the Palomino property is located. The fire rapidly advanced through the light, flashy fuel bed, focused by the topography towards the property. Sloping terrain behind the property to the east also contributed to the funneling of heat through traditional convection from the numerous spots fire which became established in a small valley to the east of the property. During this time period, numerous structures in the vicinity were well involved in fire, further increasing available embers for spot fire production downwind.



## **Jesusita Fire – Final Summary**

**Incident Complexity and Incident Command Decisions** The Santa Barbara front country historically has been a challenging location to fight a wildland fire. Based on the mid slope location of the Jesusita Fire, potential winds, and proximity to urbanized areas, the decision to order an Incident Management Team very early was an excellent decision. Unified Command was initiated very early as well, and the ordering of the CAL FIRE Incident Command Team was based on predicted fire spread.

**Extended Attack Incident Management Challenges** The early decision for a Type I Incident Command Team illustrates the challenges for the Extended Attack incident management on the evening of May 5 and during the day on May 6, 2009. Ramping up quickly, and providing incident management prior to the full Incident Command Team was a challenge. Setting up an Incident Base, producing the Incident Action Plan (IAP), resource ordering, incident staffing, frequency coordination, correct weather forecasts, and allocating staged resources were challenges for the Extended Attack management. The contingency plan developed for this area during the 2008 Zaca Fire was not utilized.

**Operations Section and Branch Director Interaction** The Operations Section Chief directed the actions of two perimeter branches and one structure protection branch. As the fire behavior increased on the afternoon of May 6, 2009, and the fire began moving quickly down slope toward the Mission Canyon area, the functions of perimeter control and structure protection became in conflict. Perimeter control branches directed their resources out of the area due to the extreme fire behavior, and into a safe area. The same increased fire behavior increased the threat to the structures in Mission Canyon, and at the same time perimeter control forces were leaving, additional structure protection resources were being requested and placed in the area.

**Fire Behavior was Underestimated** The early May time period as well as the observed fire behavior prior to the surfacing of the winds on May 6 led many fire suppression resources to believe control objectives could be easily met. The backing fire that was completely consuming mature stands of chamise illustrated the low fuel moistures in the fuel bed. This was observed by many, but this did not trigger any concern over fire suppression operations.

**Structure Protection Resource Deployment Decisions** The structure protection of Mission Canyon and other surrounding areas was a priority for the extended attack incident commanders. Fire suppression resources assigned to structure protection had opportunities to survey or triage the areas, and develop a resource deployment strategy. In most cases, inadequate safety zones were

identified or travel times to a designated safety zone were unrealistic due to the narrow roads and congestion. Trigger points or decision points were met for withdrawal of resources, but conditions had deteriorated or time was now inadequate to move to the safety zones.

**Structures Utilized as Primary Safety Zones** Due to the lack of or distance to a true safety zone, various structures were identified by fire suppression resources as a safety zone.

**Decisions to Stay and Defend Structures** The decisions by company officers and chief officers to “hunker in” or stay and defend structures in untenable conditions led to the turnover and near misses. Tactical decision to utilize hydrants and lay supply line also led to loss of mobility and the lack of ability to move out of the area to a safety zone.

**Use of Breathing Apparatus During Structure Protection** Breathing Apparatus were used by fire suppression resources during structure protection. To remain in a position that a breathing apparatus must be used to provide structure protection is a situation that places wildland firefighters in an untenable condition. Movement of personnel and resources to an appropriate safety zone would be warranted. It is understood that there may be times when multiple structures are burning that appropriate airway protection can include breathing apparatus, but only within the capability and training of the firefighters. There is no doubt that the wearing of the breathing apparatus by VNC FC-54 and VNC FF-54 protected their airways and saved their lives. But, to preplan the staging of breathing apparatus inside the structure for usage as a last resort should never replace the removal of personnel and equipment to a safety zone.